





Christmas 1928

Louis Fred Trubshaw  
from  
Oma. Vilter









The Book *of* Wild Flowers



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# THE BOOK *of* WILD FLOWERS

An introduction to the ways of plant life, together with  
biographies of 250 representative species and  
chapters on Our State Flowers  
and Familiar Grasses

WITH COLOR PLATES OF 250 FAMILIAR  
WILD FLOWERS AND GRASSES

Exploring the Mysteries of Plant Life, *by William Joseph Showalter, Assistant Editor, National Geographic Magazine*; Our State Flowers, *by Gilbert Grosvenor, President, National Geographic Society*; Familiar Grasses and Their Flowers, *by E. J. Geske and W. J. Showalter*; Plant Biographies, *by William Joseph Showalter*; Color Plates from Life, *by Mary E. Eaton, of the New York Botanical Garden, and E. J. Geske.*

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## FOREWORD

FEW fields of human interest offer as rich returns of pleasure to laymen who cultivate them as an acquaintance with the wild flowers. One who learns to know them comes to love them, and they become companions who give every stroll a charm, and make every path lead to a Treasure Island of inspiring meditations.

They lure their friends into the open where health and vitality are gleaned. They take their devotees up to the mountain tops of Nature at its best, and show them kingdoms of knowledge that may be possessed with but little pains.

In their silent cell laboratories they accomplish more wonders than all the genii of the Arabian Nights, the sum total of their labors making the toil of man seem pigmy endeavors in comparison.

In their methods of solving the problem of the perpetuation of their species they employ agencies and meet situations with a success that leaves the beholder spellbound.

In their adaptation to environment, if they were sentient beings, endowed with all the wisdom of the world's intelligentsia, they could not make themselves better masters of their respective situations than they are.

It is to introduce the reader to the wild flowers as they really are, so that they might take him by the hand, and lead him out into the open spaces where they can reveal to him ten thousand wonders blindly passed by many, that this book has been written.

Dr. Grosvenor's chapter on the State Flowers is a timely recapitulation of the status of legislation on the selection of emblem blossoms. In 1917 he published an article "Our State Flowers," in the NATIONAL GEOGRAPHIC MAGAZINE, which focussed the attention of the flower-loving world on the subject, with the result that nearly a score of States have since taken action, most of them officially, through their legislatures.

Too much cannot be said in praise of the 120 pages of flower paintings contributed by Miss Mary E. Eaton, of the New York Botanical Garden. Those best qualified to judge regard Miss Eaton the greatest of living wild flower painters. She has not only painted the likeness of the flowers with the highest botanical accuracy, but she has been able also to put the very soul of the plants into her paintings.

Likewise, Mr. E. J. Geske's eight paintings of the flowers of familiar grasses as a microscope reveals them, show how blind our eyes are to a thousand beauties of Nature, and teach us that sharp eyes find rich nuggets of interest everywhere.

Washington, D. C., 1924

WILLIAM JOSEPH SHOWALTER



## CHAPTER I

# Exploring The Mysteries of Plant Life

By WILLIAM JOSEPH SHOWALTER, Sc.D.

Author of "Exploring the Glories of the Firmament," "The Automobile Industry," "America's Amazing Railway Traffic," "Map-Changing Medicine," "How the World is Fed," etc., in the NATIONAL GEOGRAPHIC MAGAZINE.

### PART I

#### HOW PLANTS WORK

ALL the factories, all the railroads, all the mines, all the automobiles, all the activities of man of whatsoever nature that require power, do not utilize as much energy as is developed by the plant world.

Out of intangible sunshine, insubstantial air, and clear water, coupled with a modicum of mineral matter from the soil, plants must manufacture all the food that keeps alive the innumerable hosts of animals of the earth, store up all the heat that keeps humanity warm and cooks its food, furnish most of the power that drives its industries, and provide the raw material for all the clothes mankind wears and many of the products of which his factories, his houses, his furniture, and his books are made.

Would you know how much of a plant is fabricated of sunshine, air, and water, and how little of solids from the earth? Then burn that plant and notice the thin layer of ash remaining. All else has been made up from subtle sunbeams, thin air, and plain water.

Every plant, from a simple moss to a giant tree, is in reality a vast household of individual entities working together, in fine coöperation and close harmony, to a common purpose. One group pumps up the water required by the community, which is carried to the points where it is needed by another group.

Others, respectively, obtain the solid food from the ground, mix it with air, sunshine, and water to make a substantial dish; carry the food to the various parts of the household; store up the leftovers; build additions to the house; and prepare to send out colonies from the parent roof-tree, fully "grubstaked" and equipped to gain a foothold wherever they may settle down.

One observer sees the individual plant as a counterpart of a busy little city, teem-

ing with life and bustling with industry. Here goes on the pulling down and building up characteristic of progressive communities; the streets and alleys are thronged with workers; here are dairies and milkshops dispensing their supplies; jewelers' shops preparing crystals; sugar refineries manufacturing sweets; starch factories storing foodstuffs; perfumers' laboratories distilling scents; varnish makers developing resins and waxes; color establishments preparing dyestuffs.

#### EACH PLANT BUILDS ITS OWN CELL CITY

The ways by which individual plants build their houses and do their work form a story no less fascinating than the methods by which the flowers hand their lives on to future generations, though they themselves are destined to perish.

The seed that finds its "place in the sun" settles down and awaits the hour when propitious conditions of moisture and warmth shall awaken the germ of life that sleeps within.

Once this little speck of living matter is aroused in its tiny cell it becomes busy, sending out bits of itself to the neighborhood around it. Each of these promptly builds itself a tiny house of its own, with walls a thousand times thinner than the finest gossamer, but still constructed of microscopic bricks of cellulose, between the interstices of which the pioneering protoplasm can maintain connection with the parent cell, and at the same time reach out and start its own children to building other cells.

The size of these cells varies. A single cubic inch of fine cork may have as many of them as there are people in the world, yet each one has been built and inhabited by a protoplast, which has not only patiently thickened the wall of its house, layer by layer, but has also done its bit in the life of the community of which it is a part.



Photograph by Mary Beal

#### WHITE SUNDROPS AND PINK ABRONIAS ON THE MOHAVE DESERT, CALIFORNIA

In man's laboratories a temperature of about 2,400° F.—enough to melt pig iron—is required to separate the carbon and oxygen atoms of the carbon dioxide molecule. The plants, in their little cell laboratories, are able to separate them without difficulty.

When the microscope was first invented and philosophers peered into these little houses and saw the inchoate plasm within, amazement and awe possessed them. Jan Swammerdam, the great Dutch student, became almost insane at the marvels his lens revealed, and finally destroyed his notes, holding it a sacrilege to unveil and thereby profane the wonders hitherto beyond human ken.

The things the pioneers saw were considered delusions, until the members of the Royal Society of London peered through a microscope and jointly signed a paper saying they had seen these wonders with their own eyes.

#### THE "SILENT ROAR" OF THE VAST PLANT INDUSTRY

A somewhat viscid substance, not unlike the white of an egg, though thicker, the

bit of protoplasm within a cell does the fundamental work of all organic matter.

Huxley, in speaking of the stirring activities of the busy little protoplasts, or individual bits of protoplasm that build their several cells and do their respective community tasks in a plant's activities, says: "The wonderful noonday silence of a tropical forest is, after all, due only to the dullness of our hearing; and could our ears catch the murmur of these tiny maelstroms, as they whirl in the innumerable myriads of living cells which constitute each tree, we should be stunned, as with the roar of a big city."

And whoever has seen the radio receiving set catch the infinitely small impulses of electricity and amplify them into sounds that fill a loud speaker can appreciate his statement.

As it grows, the little community of





Photograph by J. Horace McFarland Co.

### MERTENSIA, OR VIRGINIA BLUEBELLS, CARPETING A WOODLAND IN THE SPRINGTIME

The lilies of the field seem not to toil and spin, yet they accomplish a work which makes that achieved by man, with all the noise, bustle, and roar of his factories and commerce, seem small in comparison.

protoplasts that build a plant divides its labors, and the complex activities of the growing flower begin.

The whole community of cells constitutes the plant, and through the delicate interstices of their walls the inhabitant of each communicates with those of all the other cells, so that the living substance of the entire structure is in constant contact and forms one united mass.

The building of their own tiny houses by the individual protoplasts is an immeasurable boon to humanity. Without these our plants and trees would never exist and all we would know would be masses of slime.

#### SIGHT-SEEING IN A DAISY

Let us reduce ourselves to the size of

a molecule of water and ramble through one of these cell cities we call a daisy, noting the hustle and bustle and industry constantly taking place.

We promptly discover that one of the principal things going on is the manufacture, by the protoplasts, of a myriad tiny green grains which have been named chlorophyll. These grains have the power to screen out all the rays of light except the red and most of the blue, indigo, and violet series, which they use in their work.

Concentrating these useful rays on the stream of minute particles of carbon dioxide which come into the leaves through their pores or stomata, the chlorophyll breaks the carbon and oxygen apart and unites the carbon with water,



Photograph by Curtis and Miller

#### A RARE HAREBELL FOUND ONLY IN THE OLYMPIC MOUNTAINS OF THE STATE OF WASHINGTON

Seeking out every little cranny and crevice in the rocks, plants often aid in their disintegration by their power to extract minerals even from stone.

which thereupon becomes grape sugar.

In man's laboratories it takes a temperature of  $1,300^{\circ}\text{C}$ ., enough to turn the hardest steel into liquid, to separate the carbon and oxygen atoms of the carbon dioxide molecules exhaled by animals and absorbed by plants. But the little laboratories of the cell city do it without difficulty, and in so doing fabricate the basic food of all organic life, grape sugar.

To make a pound of the sugar, our guide tells us, the plant must work over nearly ninety gallons of carbon dioxide, in the extraction of which it has had to filter thousands of gallons of air. The sugar factory works from sunup to sundown, the eight-hour day being unknown there. But it operates only when the leaves are out.

#### A LEAF AS A FACTORY

How closely the sugar industry in the plant parallels the activities in a human factory is shown by the fact that the leaf corresponds to a building, the cells to the several rooms therein, the blue and red sunlight rays to the power employed, the chlorophyll to the machinery used, carbon

dioxide and water to the raw material utilized, grape sugar to the manufactured product, and oxygen to the by-product.

As we move along we see a constant stream of carbon dioxide particles rushing by, passing through the cell walls, where they meet the molecules of water. The chlorophyll grains turn their burning glasses with their red and blue rays upon the materials thus gathered into the retort and grape sugar is formed.

After the chlorophyll grains have made the grape sugar, some new workers take it and transform it into starch, which is stored in cells for future use, just as the iron manufacturer converts his molten metal into pig iron, stores it, and melts it again when he wants to use it. A thousand square feet of leaf surface will manufacture one pound of starch in five hours of sunlight.

The action of plants in storing up starch closely parallels that of business men in accumulating estates. Just as the business man invests his funds so that they will be available for conversion into ready money if he needs it, so the plant puts by its earnings in the form of starch





Photograph by Ernest L. Crandall

#### EVEN A DECAYING TREE GIVES LODGMENT TO PLANTS: PLUMMERS ISLAND, MARYLAND

The individual plant is the counterpart of a teeming city—its millions of cells, the houses; their microscopic inhabitants, the populace. Sugar refineries, starch factories, milkshops, perfumers' laboratories, and dyestuff establishments are all in operation (see pages 1, 2, and 3).

ready for reconversion into the coin of its realm, sugar, if necessary. And just as the business man bequeaths his estate to his children when he dies, so the plant transmits its surplus to its posterity when it passes.

Men and animals have learned to rob the plant of its savings and its children of their patrimony by eating things rich in starch.

A third material is made by the plant which is used in its building operations—inulin. It closely resembles starch, and is fabricated by another set of workers.

While all these manufacturing activities are going on in the cell city we call a daisy, sap must also be provided, for without rich supplies of moisture and a tiny bit of mineral substance the wheels of industry of the community cannot revolve.

So the roots act as pumps and bring into the city vast supplies of water with mineral in solution, in the proportion of a grain of minerals to a gill of water. This sap is pumped to every part of the plant and bathes the protoplasm of every

cell, keeping the protoplasts moist and in high spirits.

#### THE RÔLE OF CELLULOSE

Out of the sugar, starch, and inulin fabricated by the three types of workers we have visited, other products are built, such as cellulose, which forms the microscopic bricks out of which the cell walls are constructed, and the fixed or fatty oils which are stored up in seeds, bulbs, etc., as reserve material for future exigencies.

As our guide leads us on through our daisy we see the cellulose being fabricated. The fibers of cotton, the pith of woody stems, and the filter paper of the chemist are familiar forms of cellulose.

The plant makes it serve a double purpose, now as cell wall material, and now as a stored product that may be reconverted into sugar if needed for food.

As the cell ages, lignin may be added to give stiffness to the plant structure, making wood; other materials are employed to give hardness to the shells of nuts, waterproof character to cork, or gumminess to seeds like flax.



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### A WASHINGTON WATERLILY GARDEN, WITH SWEET-SCENTED WHITE WATERLILIES IN THE FOREGROUND

The flowers build up proteins or flesh formers, and some of them use as many as 15,000 atoms of carbon, hydrogen, oxygen, nitrogen, sulphur, and phosphorus in making a single molecule, which becomes a far more complex thing than an automobile or a watch. No wonder man has not been able to progress far forward in making synthetic plant products!



It is the cellulose of plants which lived long eras ago that we burn when we use coal to-day. Nature bottles up sunshine in it, so that every engine driven by coal is indirectly a solar engine, and every bit of warmth our fires afford in winter is the heat of summers millions of years past.

If we visited other plants and entered into their cell communities we would see them manufacturing the malic acid of apples and currants, the citric acid of lemons and oranges, the tartaric acid of grapes; the waxes which make some flowers, like the nasturtium, immune from wetting; the resins which salve the wounds of injured plants; the glucosides which make the wonderful hues of autumn, and the poisons which protect the plants and serve humanity, such as strychnine and morphine. Still other workers are building up the proteins or flesh formers.

But most interesting of all the products made by the plant, perhaps, are the enzymes. They convert sugar into starch and starch into sugar. They have been called the tools with which the protoplasm effects the chemical results it requires. Dr. Frederick V. Coville, the eminent botanist of the United States Department of Agriculture, has shown that it is the chilling processes of winter, and not the warm sunshine of spring alone, that cause the buds on the northern trees to open. He has described how they are driven out by the terrific forces released when the enzymes penetrate the walls of the starch cells and convert the starch into sugar.\*

#### PUMPING UP A WATER SUPPLY

An examination of the machinery by which plants take in the raw materials out of which they fabricate so many marvelous substances reveals many interesting mechanisms.

Inspecting the seedling of a mustard, one finds that it has a slender root covered with a multitude of tiny hairs. At the end of the root is a growing tip.

If a potted plant is cut down to the surface of the soil and a glass tube slipped over the stump, it will be noted that the sap which would have flowed through the plant rises up in the tube to the approximate height of the original plant.

This sap consists of water and mineral matter drawn out of the earth by that strange process of Nature through which the weaker of two solutions passes through a membrane separating them into the stronger.

The protoplasm acts as a membrane, and the water in the soil is drawn through it to join the sap in the root. As the volume increases the osmotic force drives the excess up into the plant structure.

The hairs of plant roots are ever busy pumping in water. Through capillary attraction in the soil, particles several feet away are made to contribute their moisture to the hairs. A cubic foot of clay may have as much as three acres of particle surface exposed to the moisture drafts of a root system.

Between the water the plant uses in the manufacture of grape sugar and the much larger quantity it must pass through its system to keep the plants from wilting, heavy drafts are levied on the soil.

An oak tree with 700,000 leaves is estimated to give off 120 tons of water a season; an acre of grass has been found to give off more than six tons in a single day. From 200 to 500 pounds of water are given off by plants for every pound of dry substance manufactured.

#### SUCTION AND FORCE PUMPS

It has been estimated that if the rainfall during the month of July, in the corn belt of the Mississippi Valley, is one-half inch short of the three inches required to make a full crop, that half-inch shortage costs the farmer five dollars for every one of the millions of acres of corn grown in that belt.

The osmotic power in the plant is supplemented by other agencies to carry the water to the top of the tree. As a big tree must do the equivalent of carrying 500 bucketfuls of water up a ten-foot flight of stairs every ten hours in midsummer, one may judge how important the process is.

The chemical processes going on in the interior of a plant in the growing season develop considerable heat, just as the friction in an automobile motor makes it hot. To carry off the heat engendered in his engine by friction, the motorist employs a cooling system, with water caused to circulate in a radiator system.

The plant needs even more effective cooling to keep down the heat of chemical

\*See "The Wild Blueberry Tamed," in the NATIONAL GEOGRAPHIC MAGAZINE for June, 1916.



© Asahel Curtis

## FLOWERS AROUND REFLECTION LAKE, MOUNT RAINIER NATIONAL PARK

The little protoplasts that build the myriads of cells which constitute a plant are all as much alike as peas in a pod; but some of them build roots, others stems, others leaves, and still others flowers. They divide their labors as systematically as the best human community.

change. The major portion of the water it demands is employed to keep its "radiator" full in order that evaporation on the leaf surface may reduce the plant's temperature.

Many plants have damper systems, whereby excessive radiation is checked, a method corresponding to our employment of hood covers and winter fronts on our automobile engines.

The mineral matter drawn into plants in solution is made available in many ways. The earthworms are allies of plant growth.

It has been estimated that an acre of arable land contains an earthworm population of 130,000, and that they pass two tons of soil through their gizzards every season, converting it into humus rich in soluble minerals.

Lichens will eat into marble like acids in getting mineral material for their up-building. Different kinds of plants need different minerals—potatoes and turnips call for plenty of potash, wheat and corn for much silica, beans and clover for considerable quantities of lime.



## PART II

## METHODS OF REPRODUCTION

THE varied and ingenious methods by which the flowers reproduce their kind and maintain the life of their several species, while the individuals die, are of paramount interest.

There are some plants, such as bacteria, which multiply by simple division. Others develop bulblets which take root and grow, like the lilies. Still others develop suckers, runners, and stolons, as in corn, strawberries, briars, and the like.

## FLOWERS NOT PRIMARILY FOR OUR PLEASURE

But sexless reproduction is the exception and not the rule. Most plants are reproduced by "setting seed," and these always have flowers.

Once it was thought that these flowers were made chiefly, if not wholly, for the pleasure of human senses. To-day we know that the manifold varieties of floral forms we see are mainly devices developed by the plant to secure the perpetuation of the species.

They must protect their tender stamens and pistils; they must attract the insects that serve them and compensate the service; they must repel the insect "spongers" who would live at their board and render no service. They must employ other vehicles to secure fertilization.

It is to meet these conditions that the flowers have developed the calyx, or bud covering; the corolla, or petal series; and all the other parts of the blossom in the infinite variety of design and arrangement that we know.

"A living machine for making seeds," the flower has been called, and the essential parts of this machine are pistils and stamens. To fertilize the ovules of the pistil with the pollen grains of the stamen, and thus to start the "promise of the plant that is to be," is the flower's problem.

Less virile flowers, possessing both stamens and pistils, fertilize themselves. More progressive ones also having both stamens and pistils, scorn self-fertilization, and in others the sexes are so separated that stamens and pistils occur in different flowers or even on different plants.

Some of these employ the wind and the water as messengers for carrying pollen from mature stamens to receptive

pistils. Such flowers are rigid economists except in the matter of pollen, of which they are profligate spenders. Insects might be attracted by pleasing odors, bright colors, and sweet nectar, but the wind and the water pay no attention to such things. So color, scent, and sweetness are absent.

But there is greater need for pollen, since wind and water are poor messengers and must be loaded down if any of the pollen is to reach its proper destination.

## THE WATER PLANTS' PROBLEMS

Some of the water-fertilized plants have had to adapt themselves to fertilization under water, and hence have provided themselves with pollen of the same specific gravity as water. Others must be fertilized at the surface, and these launch their pollen grains on floating rafts. The water-living grass wracks produce pollen grains that become threads after leaving the anthers.

When the water-living tasselgrass matures its pistils and stamens in separate flowers, their stalks suddenly shoot up to the surface of the water, no matter what the depth, and the staminate flowers there spread their pollen abroad.

But the most interesting of all the water-living plants in the matter of fertilization is the familiar wildcelery. The female flower raises its head to the surface on a long stalk, but the male flowers remain entirely submerged until the time for fertilization comes. Then their buds detach themselves, float to the surface, and curve back their sepals, so as to make a raft for their two perfect stamens. These float about until they meet the female flowers.

Once the female flower is fertilized, the flower stem contracts and the flower is drawn beneath the surface, where it matures its seeds.

The wind-pollinated plants include many of the forest trees and most of the grasses. The pines with their cones, the hazels with their lamb's tails, the broad-leaved docks and the ordinary sheep sorrel with their pendulous flowers, the plantains and sedges with their scapes, the rye with its beard, are examples of wind-pollinated flowers.

A little farther up the line of floral development we find species of plants in the very stage of transformation from wind lovers to insect lovers—from ane-



Photograph by Alexander Wiederseder

#### A FINE SPECIMEN OF THE CHAPARRAL YUCCA: CALIFORNIA

The story of the relations between the yucca plant and the yucca moth constitutes a marvel of biology (see text, page 12).

mophilous to entomophilous plants, as the botanists would say.

The flowers that are insect lovers are usually beautiful, fragrant, and sweet, for they must appeal to the insect's senses of sight, smell, and taste.

#### FLOWERS ARE DELIGHTFUL HOSTESSES

They make fine hostesses. As one writer has charmingly put it, they not only decorate their houses in delightful colors, perfume the palatial walls with gracious scents, and powder their pretty faces with golden pollen, but accepting the ancient proverb that entertainment does not reach its climax until bread is broken with the guest, they provide rich viands of sweets.

However, they must be careful not to overfeed their guests, lest, sated, these would linger too long and not respond to the other invitations that are essential to carrying out the flowers' designs.

Likewise, they must bar their doors to the unbidden visitors that, unable to render service in return, would clutter the receptions and spoil their parties.

This problem is met in various ways. Many of the gentians use the opposite leaves to form collars to prevent the walkers from reaching the door. Others, like the snowdrop, hang their heads, so that the creeping creatures can't get in, and only the winged folk can call.

Some provide downcurving hairs along the stem, which form an abatis against the unwelcome guests. Some, like the verbenas, even place hairs on the flowers themselves.

Many of these unwanted guests are so persistent that they would steal in at the back door if they could, and some of the flowers thwart this maneuver with a swelled calyx that keeps the nectar safe, even if the walls are gnawed through.

Honeysuckles and similar plants constrict their corollas, so that only the insect with a long tongue can reach the sweets at its base.

Flowers like the toadflax and the snapdragon have mask-like corollas, which close the doors of the banquet hall to all visitors that have not the strength to push them ajar.

Sticky secretions along the stem and on the calyx form another device that some of the flowers, among them the catchfly, use to keep out the uninvited.



The tutsan-leaved dogbane, which is called the fly gulper by the French, causes its stamens to nip the intruding flies by their proboscides, and to hold them tight until the insects die. Then the hold is released and the dead creatures fall to the ground.

#### PLANTS THAT MAINTAIN ARMIES

Some plants go still further in protecting themselves. They provide little crystals of sugar on the exterior of the flower, of which certain species of war-like ants are very fond. This enables the plant to maintain a garrison of defenders, and woe betide the beetles that would gnaw its nectar cups!

About three thousand species make such provision for the maintenance of standing armies. Some of the acacias go even further than this, actually providing sentry boxes in the shape of hollow thorns for their defenders. They also prepare, in addition to the sugar, little bodies of albuminous matter at the tips of the leaflets, which serve the ants as food.

Orange growers in China and fruit growers in Italy make use of this relationship between ant and plant by establishing ant hills at the bases of their trees, thereby accomplishing the results we achieve by spraying.

Cross-fertilization by insects has been said to produce a sort of floral aristocracy, with larger blossoms, brighter hues, sweeter scents, and richer nectar. Usually the guests come and go at will, but not always. Sometimes they are actually kidnapped and held prisoners until they have rendered their service—for a flower's invitation always has the string of obligation tied to it.



© Ernest L. Crandall

#### A DAYLILY ENTERTAINING A BUTTERFLY GUEST

One of the birthworts, for instance, has hairs in the corolla which permit the ant or other creature to enter, but hold it prisoner until it has crawled all over the stamens and pistils, and is either loaded with pollen by the one, or has had its burden taken from it by the other. Sometimes the imprisonment lasts for as long as sixty hours.

The Dutchmans-pipe accomplishes the same object by making the tube leading to the nectar so smooth that the small flies entering it cannot get a foothold on the way out, until the flower withers.

Some of the orchids secrete a copious supply of nectar, which is poured into a little chamber that has an overflow spout to discharge the surplus. The bees visit the flower to gnaw the sweet, fleshy ridge within. In doing so, they frequently push their fellows into the nectar chamber, where they get involuntary baths and



Photograph by Curtis and Miller

#### AVALANCHE-LILIES IN SPRAY PARK: MOUNT RAINIER, WASHINGTON

The flowers follow the retreating snows in lofty mountains and high latitudes with a promptness that makes them appear to be armies pursuing an enemy.

from which they can escape only through the overflow spout. This forces them to rub their bodies against the receptive stigmas, and thus leave with the latter pollen from a previously visited flower.

#### THE YUCCA AND ITS MOTH

The yucca moth and the yucca flower have formed a striking flower-insect partnership. When night comes, the female moth will be found busily engaged in visiting yucca blossoms and scraping the anthers bare of their pollen.

This she makes into a ball. When enough flowers have been visited to make the ball two or three times the size of her own head, she flies away to another blossom whose pistil has reached the receptive stage.

There, with her ovipositor, she makes an incision in the pistil, puts her egg into the cut, and then runs to the top of the stigma and rams the pollen into its funnel, which insures the setting of seed.

The mountain-laurel fastens each of its stamens down in a corresponding pocket of the corolla. When a bee visits the flower and treads around over the corolla in its task of draining the nectar cup, it steps on the stamens one by one. This

releases them after the manner of a mouse springing a trigger trap, whereupon the stamen springs up and over the back of the bee, dusting it with the pollen in the anther.

Some flowers, like the milkweed, grip the legs of insect visitors and hold them fast. In trying to "yank" the trapped leg free, the bee pulls loose a little saddlebag arrangement, containing two packs of pollen, which adheres to the leg. Flying away to another flower that has a receptive stigma the insect leaves the saddlebags with it.

Not all flowers, however, attract their guests by fragrance and beauty. Some of them claim the attentions of the flesh flies, for instance, and affect a resemblance to decaying flesh, both in color and odor. The carrionflower and the skunk-cabbage are examples of this departure from the orthodox.

The arrangements by which flowers having both stamens and pistils prevent self-fertilization are of various types. Some, like the meadow cranesbill (*Geranium pratense*), mature their stamens first. The stigma does not develop to a receptive condition until after the stamens have discharged their pollen.





Photograph by Curtis and Miller

FLOWERS THAT WILL NOT WAIT FOR THE SNOW BANK TO DISAPPEAR: MOUNT  
RAINIER NATIONAL PARK, WASHINGTON

Others, like the introduced birthwort (*Aristolochia clematitis*), solve the problem the other way around, maturing their stigmas first and holding back their stamens until after the stigmas have passed the receptive stage. There are other devices employed to accomplish the same end, each remarkable in its effectiveness.

COLONIZING METHODS EMPLOYED

That plants must send out colonies, though themselves rooted to one spot, is plain to all who give the matter a moment's thought. If they did not, they would finally reach a point of density and competition where few, if indeed any, could survive. Furthermore, the soil in many cases would become so exhausted that they would starve.

Still further, conditions are ever changing, and new and more favorable locations are ever developing.

Some plants colonize by powers of independent locomotion. For instance, the slime molds—those unorganized masses of living protoplasm found in decaying wood, wet earth, or neglected flowerpot—creep along in a given direction precisely

as does the amoeba among animals. Some algae develop spores possessing tiny hairs which vibrate and propel them through the water. Others have little flagellums that act like tractor propellers on an airplane in drawing them through the water.

Colonization through extension of growth is a frequent method employed by higher plants. The strawberry with its runners; the yarrow and the apple tree with their suckers; the mushrooms with their mycelial threads and fairy rings; the briars with their stolons, and the walking ferns with their fronds rooting at the tips, are examples of this method of colonization. So is the Solomonseal which grows underground year after year, the old parts dying as new ones are formed.

Of course, plants that send out runners cannot travel fast or far, and other means of colonization are demanded by those which seek to go great distances.

Seed expulsion is one of the improved methods of spreading a plant's domain. In the vetches the pods burst open, the two halves of the pod twisting in opposite directions. In the wild geranium the

ripening styles suddenly curl up and burst open the seed box.

In the castor-bean, the witch-hazel, and the acanthus the valves of the capsules burst, shooting out the seeds. In the violet the slick seeds are caught between the two sides of the ripening pod, which squeeze harder and harder until the seeds are shot away, exactly as a boy shoots a bean by pressing it between his finger and thumb.

But all the mechanical arrangements by which plants and flowers send out colonies without outside help would come far short of the needs of the situation. They must enlist the aid of outside agencies, such as the birds, animals, and even man, to reach the far-flung positions so many of them aspire to possess.

One method by which they are able to command this service is by developing seeds with hooks, which cling to hair or feather or clothing. The seeds of the close-clinging burdock, the cocklebur, the beggar-tick, and the Spanish-needle are familiar examples.

Hooks are less efficient in holding on to feathers than glues, and, as might be expected, there are many plants that develop sticky seeds to insure transportation by the fowls of the air. Birds in this way often carry seeds hundreds of miles. The mistletoe berry and the twinflower are examples of plants providing their seeds and fruit with adhesive material so that they can use the birds as animated airplanes.

Other plants bring about the transportation of their seeds by animals either by developing seeds in edible fruits or edible kernels in hard shells. The peach and the blackberry are types of the former, and the hickory nut of the latter. Neither kind is attractive as food until the seed is mature.

#### ATTEMPTS TO DECEIVE

Some seeds seem actually designed to deceive animals and to procure their dispersal by fraud. Cow-wheat, for instance, produces seeds so closely resembling ants' eggs that many of them are found in ant hills. One plant produces a seed pod resembling a caterpillar relished by birds; another, a seed resembling a beetle.

Some of the castor-bean plants produce seeds resembling fat ticks. In all such cases it is soft-billed birds the plants seem to impose upon. Their seeds wouldn't have a chance of safely passing through the gizzards of the grain eaters.

Most of the weeds of America are of Asiatic and European origin. They have come as stowaways, and, after landing on our shores, have spread with tremendous rapidity. They have relied on man for their dispersal and have not been disappointed.

Water dispersal of seeds has been employed by many plants. The Hindu lotus, some of the waterlilies, and the coconut palm are examples of water-borne seeds. No matter what the geological history of the vast number of islets in tropical seas, their shores are fringed with coconut palms. With their great air-filled husks, the coconuts travel up and down the seven seas for months and years until they find a beach where they can get a "root hold."

Wind-dispersed plants are numerous. We see them resorting to all kinds of stratagems to command waftage by the winds. The parachute plume of the dandelion, the down of the thistle, the silky plume of the virgins-bower, the soft tuft of the milkweed, are examples of the effective vehicles which carry seeds far and wide on the wings of the wind. The propeller-blade seed of the maple is another typical device utilized for seed dispersal.

Still other plants gain the aid of the wind by folding themselves up into balls and waiting for gusts to come along, uproot them, and drive them to new habitations, scattering their seeds as they go. The Russian thistle and the rose-of-Jericho are characteristic "tumble weeds."

In Russia there is a plant known as the "wind witch," which has a root like a radish. When it matures the branches of the stalk curl down and pull up the plant, root and all. Then it waits for a high wind to rise and blow it away to some new location where it can take root again and begin a new career.

### PART III

#### PLANT BATTLES FOR EXISTENCE

AS diverse in their form as in the activities of their cells, the plants and flowers of the world exhibit every gradation in size from the big sequoia of California and the great eucalyptus of Australia to the tiny germs of tuberculosis and the microscopic bacilli of typhoid. They show every



variation of form from graceful trees and airy blossoms to unfashioned slime molds and unorganized fungi.

They reveal every combination of color from the deepest red to the richest violet. They present every kind of texture from the ivory-hard seeds of palms to the jelly-soft fronds of seaweeds. They disclose habits that range from bold and beautiful independence to insinuating and crass parasitism.

The ability of plants to live and work under adverse conditions and to adjust themselves to their environment is one of the marvels of creation. Some two hundred thousand species have been catalogued and described, and they have adapted themselves to every conceivable sort of environment.

Some live in water, others in desert places; some rejoice in eternal sunshine, others prefer polar cold; some choose the seashore, others select the mountain peak; some thrive on thin air, others dwell in caves; some inhabit the human body, others have learned to thrive even where air is entirely absent. Some, indeed, find hot springs to their liking, and others begin to cover a new volcanic lava flow almost as soon as it ceases to glow.

Dependent on outside agencies for fertility, they call the winds to their service, enter into reciprocal relationships with insects, and develop devices of a high mechanical order.

Rooted to the ground, they are, next to man, the world's most eminent colonizers, drafting the winds, the waters, birds, animals, and even man into their schemes of dispersal.

Unable to run away when attacked, they have set up innumerable forms of defense for their protection, such as the thorns of the rosebush, the prickles of the thistle, the acrid juice of the golden-rod, and the poison of the mountain-laurel.

#### PLANT ANIMALS AND ANIMAL PLANTS

Kinship between animals and plants is so close that one finds between their respective kingdoms a twilight zone where animals are so nearly plants and plants so nearly animals, that biologists speak of plant animals and animal plants.

Even in their respective responses to outside influences, this close kinship is attested. Touch the eye of a frog and the eyelid closes; touch the hairs of a

Venus flytrap and the leaf closes. Etherize the frog and the leaf and neither the frog's eyelid nor the flytrap's leaf will close. Remove the ether and both will recover their sensibility.

#### PLANTS ADAPT THEMSELVES TO SURROUNDINGS

The manner in which all kinds of plants adapt themselves and their parts to their environment has long been a source of wonder to those who know the flowers best.

The leaves, whether on tree or flower or grass, always arrange themselves to command the required amount of light. Some flowers close at night and have been known to do so upon the approach of a shadow. Others will close if a red-hot poker be brought near to them. Odors offensive to them cause some flowers to close and even to die.

Insectivorous plants are largely an adaptation to environment. Usually those which prey upon insects grow in regions where nitrogen is scarce—mayhap in bogs and perchance in sandy, acid soil.

The traps of these plants are strikingly well suited for their work. The Venus flytrap's leaves stand open normally. An insect crawls in, and in so doing touches one of the three trigger hairs that project from the surface of each half of the leaf.

If the insect is worth while, the leaf shuts up tight and does not open again until the flesh of the prisoner has been digested. But if it is such a small creature as a gnat or a tiny ant, the trap opens and lets the prisoner fall to the ground.

Once a sizable insect is caught, there is no escape for it. The more the insect struggles the tighter the trap closes. On the other hand, give the trap a stone and it soon releases its hold.

In setting its snare the flytrap is not content to wait for chance prey; it actually spreads bait for them, in the shape of a sweet secretion on the surface of the leaves. It is little wonder that Darwin called this "the most wonderful plant in the world."

The competition of plants is often a fierce race for the survival of the fittest. We see the climbing plants creeping up the trunks of giant trees, stealing the sun away from the latter's leaves, and often smothering or choking them completely. Many a fine tree has been killed by ivy plants robbing it of light.



Photograph by Mile High Photo Company

#### PONDLILY PADS ON SNOW WATERS, WILD BASIN, ROCKY MOUNTAIN NATIONAL PARK

Ganong, in his excellent book, "The Living Plant," reminds us that, in the dispersal of their seeds, plants employ methods analogous to man's ways of supplementing his legs. They build rafts that match his boats, employ animals as he rides horses, devise lighter-than-air craft and heavier-than-air gliders, use birds as airplanes, and even steal rides on his ships, his railroad trains, and his automobiles.

There are many parasitic plants like the mistletoe, the dodder, and the broomrape, which have suckers that penetrate the bark of other plants and suck away their sap as leeches drink the blood of animals.

One often sees hazel and other stems looking like huge corkscrews; the deep spiral grooves have been caused by twining vines gripping the stem and preventing expansion along the spiral lines.

There is a group of plants known as *Ficus*, to which the fig belongs, whose

seeds are deposited on the branches of trees by birds. Here they germinate. The roots clamber down until they reach the soil and the stems climb up until they reach the crown of the tree. Once thus established, the hitherto soft and tender aerial roots begin to harden and to throw out branches which flow into, and amalgamate with one another, until the tree trunk is girt about with a series of irregular living hoops. Ultimately the tree is killed by these strangler figs.





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## PINESAP IN WOODS IN THE ENVIRONS OF WASHINGTON

## PLANTS ARMED FOR THE FRAY

But while competition is often fierce and the struggle for survival frequently bitter, many plants enter the conflict armed and ready to protect themselves against both plant and animal foes.

The latex of the rubber tree is not made to furnish man with automobile tires and raincoats, but rather to dress its own wounds. Does a woodpecker drill a hole in the rubber tree's trunk, the latex flows, and heals the wound. Does the beetle try to invade the cell city that constitutes the tree, it is made prisoner and duly executed. Does a mistletoe seed attempt to take root, the poisoned sap overpowers it.

As a protection against field mice, insect larvae, and other underground dwellers, many food-storing roots develop poisonous and disagreeable substances in their tissues. Sometimes these take the form of alkaloids and fetid gum resins. The soapwort, the rhubarb, the monkshood, and some of the gentians use this method of defense.

The close approach of some of the flowers to what men conceive to be intelligence has been noted by many authorities. One of them pinned a live fly on a bit of cardboard half an inch from the leaf of a sundew. In two hours the leaf

succeeded in approaching the insect and fastened its tentacles about the creature.

The evolution of plants and the development of cell communities form one of the most fascinating stories in Nature. Originally they were undoubtedly one-celled structures, some of which still survive in our times. All the varied functions of a plant thus had to be performed by a single cell.

Then, coming out of the water and upon the earth, they needed to be rooted to the spot from which their nourishment would come, and roots began to develop.

Step by step, life requirements became more complex and new conditions were met by the creation of specialized cells which could do a definite task, and the plant was gradually transformed into the complex creation that it is, largely along lines paralleling the development of peoples from simple families to highly organized communities.

We encounter plants in all stages of this rise from the one-celled primitive to the intricate modern, to-day. When they first appear, the leaf bud and the flower bud are indistinguishable. In the white waterlily the gradual stages of the transformation from the green sepals of the calyx to the yellow pollen-producing



Photograph by Mile High Photo Company

### A TRYSTING PLACE IN LOVER'S LANE: ROCKY MOUNTAIN NATIONAL PARK

In the manufacture of a pound of solid matter, a tree or a plant must evaporate from 200 to 500 pounds of water to carry off the heat generated by the chemical reactions required in the process (see text, pages 7 and 8).





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AN ALBINO WOODCHUCK AMONG FERNS ON THE FARM ADJOINING PRESIDENT COOLIDGE'S FORMER HOME AT PLYMOUTH, VERMONT

stamens may be studied, showing that the processes of evolution have gone on.

Jean Henri Fabre's account of the evolution of the cabbage is a classic picture of what the plant breeder's art—which is only an intensification of the slow and patient methods of Nature—may accomplish in the evolution of plants.

OTHER WONDERS AWAIT YOU

One might go on indefinitely, rambling through the plant world and discovering new thoughts that thrill at every turn. The bacteria, the molds, the yeasts—each of the thousand and one groups which

represent departures from the original household has a story to tell.

But this is an introduction to the marvels of plant life, and not a treatise on plants. In the biographies of the individual plants in the accompanying flower series, many additional fascinating facts are brought out.

In their natural colors, printed with Chapter IV, the flowers can tell their own stories of structure better than any words could, so that the descriptive text in that chapter is left free to tell the story of their life problems, and the fine ingenuity with which they solve them.







Photograph by Harry F. Blanchard

### A YOUTHFUL GARDENER WATERING HIS PLANT CHILDREN

Water, water, water, and more water, is the demand of growing vegetation. Ground that gets less than 2,500 tons to the acre is semiarid. Six thousand tons is about the normal annual rainfall per acre in the United States.

## CHAPTER II

# Our State Flowers

### The Blossoms Chosen by the Several Commonwealths as Their Floral Emblems

By GILBERT GROSVENOR, LL.D.

*President of the National Geographic Society*

THE quiet campaign of flower lovers in the several States to have emblematic flowers officially adopted, which was begun in 1893, when the World's Fair at Chicago was getting ready to open its gates and in which Oklahoma and Minnesota led the way, is approaching its conclusion.

To-day the legislatures of 33 of the States have enacted laws creating State flowers. In seven other States school children have blazed the way for the legislatures, by electing their favorite flowers to the honor of floral queenship. In six of the eight remaining States particular flowers have gained recognition on the basis of common consent, while the seventh, Tennessee, has chosen one through the State Horticultural Society, which choice has received official recognition.

This leaves Pennsylvania as the only State that has not, in one way or another, chosen a representative flower.

The District of Columbia and the Territories are also without chosen flowers, and a national flower still remains unselected.

Many suggestions have been made as to the choice of an emblem blossom for the Nation. But there are many difficulties in the way of such a choice.

To begin with, if the choice be limited to a single species, the candidates must be few; for the United States is so broad and its Rocky Mountains so high that only a few resourceful species have the nation-wide distribution that is the first requisite for a national flower.

And then we find that most of the comparatively few flowers that could meet the test in the matter of distribution, are not eligible because they are either weeds or lack the qualities which would

fit them for the fine rôle of a national flower.

One way of solving the problem, according to those who have given it careful thought, would be to adopt a genus whose members closely resemble one another in appearance and habit, though not in habitat. Several States furnish precedents for such a solution. Missouri, for instance, has selected the genus *Crataegus*, which embraces a number of species of hawthorns.

Nations have long honored particular flowers with heartiness and devotion—Ireland, the shamrock, that beautiful bit of green with which it is alleged St. Patrick demonstrated the doctrine of the Trinity; Scotland, the thistle, which pricked the foot of the Dane and awakened all Scotland with his cry of pain, saving her from the heel of the invader; and France, the lily, which Ruskin called the flower of chivalry (the iris, or blue flag).

In making their choices the legislatures, women's clubs, and school children of the several States were confronted in every instance by a plethora rather than a paucity of floral treasures from which to select a favorite, for the United States contains a much greater number of species of wild flowers than any equal area on the globe.

#### OKLAHOMA AND MINNESOTA ACTED OFFICIALLY FIRST

Oklahoma was the first of our States to take legislative action in the adoption of a State flower. In January, 1893, the Territorial government was considering the question of exhibits for the Chicago World's Fair and a Territorial seal. The women of Oklahoma had presented a petition asking that the mistletoe be made the





Photograph by Ernest L. Crandall

THE MAYAPPLE (ABOVE) AND THE WILD STONECROP  
(BELOW) FORM A FOREST CARPET

Territory's emblematic flower. A bill to that end was accordingly introduced and passed by a large majority.

Minnesota had a bill pending to make the ladyslipper, or moccasin flower, the State's official blossom at the same time that Oklahoma was debating the issue of the mistletoe. In February, 1893, the Gopher State was preparing its exhibits for the Chicago Fair. The Ladies' Auxiliary of the State World's Fair Commission found only an official flower lacking, which they thought ought to be used in the scheme of decorations. So they prepared a bill making the moccasin flower the emblematic representative of the Commonwealth and presented a widely signed petition in favor of its enactment. The legislature

promptly passed the bill.

The next State to take action was Vermont. A concurrent resolution to adopt a flower was introduced in the House of the Vermont Legislature, October 19, 1894. It was considered by a special committee consisting of one member from each county—fourteen in all. The name of the flower was not specified until November 8. On that date an agreement was reached which led to the amendment of the bill by the insertion of "red clover." The next State to act was Nebraska. On the 29th of January, 1895, the delegate from Boone County introduced a bill to designate a floral emblem for the State. It provided that the goldenrod should be the emblematic flower. On the 23d of March the bill was taken up in committee of the whole. One of the delegates, having in mind that Nebraska

was a free silver State moved to substitute the word "silver" for "golden." His motion was not considered, and the bill was promptly passed by the House and Senate.

Delaware was the fifth State in the Union legislatively to adopt a State flower, when by an act of the legislature, approved May 5, 1895, that State chose the peach blossom as its representative. There was very little debate and the sentiment in its favor was practically unanimous.

Montana also chose a State flower in 1895, its legislature adopting the bitter-root almost unanimously.

Michigan followed the example of Delaware in awarding its floral honors to the blossom of its favorite fruit. In the pre-

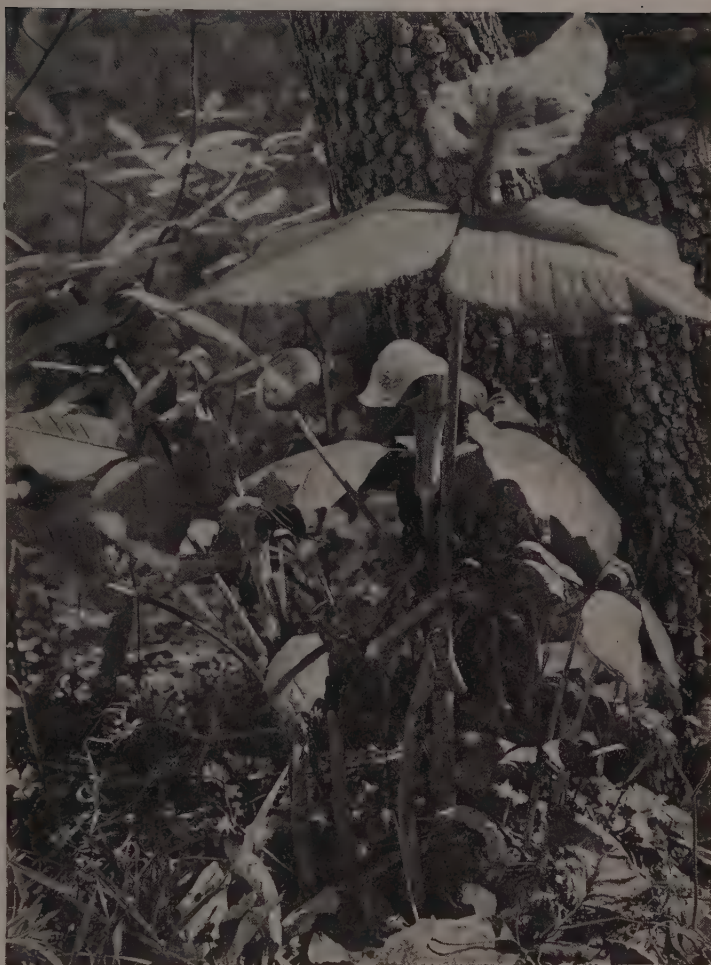


amble of its resolution, approved April 28, 1897, adopting the apple blossom, the legislature declared that a refined sentiment seemed to call for the adoption of a State flower; that the blossoming apple trees add much to the beauty of Michigan landscapes; that Michigan apples have gained a world-wide reputation, and that at least one of the most fragrant and beautiful-flowered species of apple, the *Pyrus coronaria*, is native to the State.

The year 1899 witnessed the accession of two States to the ranks of those enjoying legislatively created floral emblems. On January 30, 1899, a petition was introduced in the Oregon Senate reciting the fact that the women's clubs of Portland, in regular session assembled, had declared in favor of the Oregon grape as a State flower, and asking the legislature to enact their recommendation into law. What little debate there was indicated a practical unanimity of sentiment, and the measure was ready for the Governor's signature on February 2 of that year.

#### IN COLORADO THE SCHOOL CHILDREN OVERRULE THE LEGISLATORS

Colorado holds a unique position in the matter of flower legislation. The lawmakers of the Centennial State passed an act, approved April 4, 1899, designating the white and lavender columbine as the State flower of Colorado. This, however, did not please the school children. Accordingly, on Arbor Day of 1911 they submitted the question to a referendum in which they were the only qualified voters. Out of 22,316 votes cast, 14,472



Photograph by Ernest L. Crandall

#### JACK-IN-THE-PULPIT BEGS ALL WHO VISIT HIS SANCTUARY TO "BE MERCIFUL" TO THE WILD FLOWERS

were in favor of the blue and white columbine (*Aquilegia caerulea*). No other flower received over 1,200 votes. The Governor and the legislature seem to have concluded that the children are the court of last resort in such a matter and have apparently acquiesced in their decision.

Louisiana was the next State to act. June 20, 1900, a bill making the magnolia the State flower was read in the House. July 6 it passed that body by a vote of 62 to 2. Six days later it passed the Senate by the unanimous vote of 32 to 0.

Arkansas, by legislative action, January, 1901, chose the apple blossom.

The very next month Texas took up the question. On February 28, 1901, a Senate concurrent resolution was introduced, the preamble of which recited the



Photograph by J. Smeaton Chase

#### WHERE THE SANDVERBENA AND THE MESQUITE MEET IN CALIFORNIA

Many desert plants have learned to "make hay while the sun shines," by gorging themselves with water on the few occasions when rain falls and then guarding it, as a miser hoards his gold, while they fight their battles with scorching heat.



fact that the National Society of Colonial Dames of America, Texas branch, had requested of the legislature that it adopt "*Lupinus subcarnosus*, generally known as the buffalo clover, or bluebonnet," as the State flower. Sentiment in favor of the bluebonnet was so general that there was little debate, and the measure was passed and finally approved by the Governor on March 7.

#### IN WEST VIRGINIA ALSO THE CHILDREN LEAD THE WAY

In West Virginia the subject of an official State flower had long been a theme of discussion among teachers and others interested in school work. It did not take form, however, until 1901, when the Governor, in his message to the legislature, recommended the adoption of a State flower and suggested the rhododendron, or big laurel, as the most appropriate.

Under the direction of the State Superintendent of Free Schools, the school children of the State, on the 25th of November, 1902, voted upon the question of a selection. Out of 33,854 votes cast, 19,131 were for the laurel, 3,663 for the honeysuckle, 3,387 for the wild rose, and 3,162 for the goldenrod. On the 8th day of January, 1903, the legislature adopted a joint resolution designating the rhododendron, or big laurel, as the official State flower.

California had long been advocating the enactment of a law making the golden poppy the Golden Gate State's official flower. More than fifteen years ago a bill was introduced in the Senate and had passed both Houses, recognizing the yellow-hued beauty; but the Governor vetoed the measure. The House then passed it over his veto, but the Senate permitted it to die. The bill was reintroduced in the next legislature, January 21, 1903. It passed the Senate on February 2 by a vote of 28 to 1. It received practically a unanimous vote also in the House. On March 2 the new Governor advised the legislature that he had approved the bill, and the California poppy became the State flower of California.

The bill to make the sunflower the floral emblem of Kansas was introduced on February 10, 1903. The Senate passed it by a vote of 30 to 0, and the House by 31 to 0.

South Dakota's resolution selecting the pasqueflower as her floral emblem was

enacted March 4, 1903, and provided that on and after the passage of the act the State floral emblem of South Dakota should be the pasqueflower (*Anemone patens*), with the accompanying motto: "I lead."

#### OHIO CHOOSES MCKINLEY'S FAVORITE FLOWER

The State of Ohio officially adopted the scarlet carnation as its emblematic flower on the 29th day of January, 1904. Both Houses unanimously voted for the measure. The law is as follows: "The scarlet carnation is hereby adopted as the State flower of Ohio, as a token of love and reverence for the memory of William McKinley."

Connecticut chose the mountain-laurel as its State flower after a report of the Committee on Agriculture in the Senate favoring such action. One Senator opposed the bill, saying that he regarded it as unnecessary legislation, but that if the clover had been recommended he would have been inclined to favor it as the nearest approach in this country to the shamrock he loved. He doubted, however, if there was any necessity for the legislation. Another Senator declared that he was bound to favor anything three thousand women could agree on. In the House the choice was advocated in enthusiastic terms. Upon each desk sprigs of mountain-laurel were distributed by persons in favor of the bill. After a short discussion it passed.

North Dakota adopted the wild prairie rose by legislative action in 1907, the same year that Florida's legislature selected the orange blossom. By act of the General Assembly the violet has been the State flower of Illinois since the 1st of July, 1908.

Wyoming's legislature voted for the Indian paintbrush but gave the Latin name which applies to the narrowleaf painted-cup. Arizona chose the giant cactus as its official flower.

Utah officially recognized the segolily as its choice by act of its legislature in 1911. Indiana selected the carnation by legislative act in 1903, but has latterly dethroned that flower as queen and enthroned the tuliptree instead. Georgia selected the Cherokee rose.

Maryland has, by legislative enactment, ratified the popular choice of the black-eyed-susan; Massachusetts has taken





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### LOADING DOWN A CAR WITH WILD FLOWERS

Many communities are organizing wild flower preservation societies to save the flowers of much-frequented woodlands from extermination at the hands of those who ruthlessly destroy them after this fashion.

like action in the choice of the trailing-arbutus, or mayflower; Missouri has officially adopted the hawthorn; New Hampshire, the purple lilac; South Carolina, the Carolina-jessamine; and New Jersey, the violet.

Wisconsin has enacted a law confirming the vote of the State's school children in favor of the violet for the queenship of the State's floral empire.

Virginia has also joined the rapidly enlarging group of States whose legislatures have made choice of floral emblems, preferring the dogwood to the Virginia creeper, its closest competitor for favor in the Old Dominion.

#### THE STATE FLOWER MOVEMENT WAS STARTED BY NEW YORK

Although the State flower movement really had its origin in New York, the legislature of that State has never yet officially sanctioned a flower. In 1890 a school vote was taken in the entire State, with the result that the goldenrod was adopted by a vote of 81,308 as against 79,666 for other candidates. A year later the case was reopened, and

this time the rose led, receiving 294,816 votes as against 206,402 for all the other entries. From that time the rose has been considered New York's official flower, though the vote did not specify any particular species.

Rhode Island also chose its official emblem by the vote of the school children. In May, 1897, there was a plebiscite of the children, with the result that the violet was overwhelmingly favored and was declared the representative flower of the State.

The school children in Mississippi made the choice for that State. In 1900 the matter was submitted to a referendum with the result that the magnolia was their nearly unanimous favorite.

Maine's adherence to the pine cone and tassel was given by the vote of the public schools of the State, the same being true of New Mexico's support of the cactus.

According to reports furnished the NATIONAL GEOGRAPHIC SOCIETY by the Secretaries of State and other officials of the several States, Idaho favors the mockorange, locally known as the syringa,



Photograph by Harry F. Blanchard

## SMILES OF YOUTH AND FLOWERS OF SUMMER

by common consent; the wild rose was chosen by common consent in Iowa; the Kentucky Historical Society and citizens of Kentucky prefer the trumpet creeper, and the sagebrush is generally accepted in Nevada. The people of North Carolina favor the daisy generally, while through the work of the women's clubs the State of Washington held a contest which resulted in the choice of the rhododendron as that Commonwealth's flower.

The school children of Alabama have cast their ballots in favor of the goldenrod as their State's entry in the list of emblem flowers, while the Horticultural Society of Tennessee has voted in favor of the passionflower.

## ILLUSTRATING THE STATE FLOWERS

In our series of paintings of State flowers, covering not only those chosen by legislative act, but also those selected by the votes of school children and those preferred by unanimous consent, only one species is portrayed where several States have selected the same flower or species so closely resembling one another as to show no essential differentiation in a picture—as in the case of the goldenrod, violet, and rose.

In the case of Nebraska, the act of the legislature choosing the goldenrod as the official flower designates *Solidago serotina* as the particular species. On the other hand, this species is not the most widely distributed in other States which have a preference for the goldenrod. It is believed that *Solidago nemoralis* (page 67) is one of the most representative goldenrods, and one which would be probably the composite of preferences of all of the States having that flower, either officially or unofficially.

Colorado's legislature expressly names the "white and lavender columbine," with no Latin name attached, as the State flower; yet to-day, through a later vote of the school children, the blue and white columbine is everywhere in Colorado recognized as the State flower.

The acts of the Arkansas and Michigan Legislatures simply call for "the apple blossom." The Illinois law refers to its preference only as "the native violet," of which there are numerous species, while the Louisiana law names no species, but simply says "magnolia." The Delaware law gives no scientific designation, but speaks only of "the peach blossom."

The resolution of the Ohio Legislature names the "scarlet carnation," and the





U. S. Forest Service Photograph

## REBUKING THE DESPOILER

The forest ranger is here handing the flower vandal an opinion of his act "straight from the shoulder." Unless public sentiment backs him up, our woodlands adjacent to cities will soon be stripped of their spring-time beauty.

reader should note that the one pictured on page 190 is really too deep a red for the State flower of Ohio, which has a brighter tone.

When the State of Kansas came to adopt the sunflower, the resolution of the legislature used the term "*helianthus*, or wild native sunflower."

The resolution of the legislature of Texas sets forth that the State flower is "*Lupinus subcarnosus*, commonly known as the buffalo clover, or bluebonnet." There appears to be so little difference between *Lupinus subcarnosus* and *Lu-*

*pinus texensis* that no distinction whatever is made between them by the average Texan in plucking the State flower.

In the case of the South Dakota flower, while the artist portrays the species of pasqueflower known as *Pulsatilla patens*, the South Dakota law designates the *Anemone patens*. The main difference between the two seems to be the matter of a name, since many botanists hold that the two names are synonymous and refer to the same plant, rather than to two species.





## CHAPTER III

# Familiar Grasses and their Flowers

By E. J. GESKE AND W. J. SHOWALTER, Sc.D.

*(With Illustrations in Color from Paintings by E. J. Geske)*

THE dynasty of the grass family dates back to the days of the forefathers of the horse, the camel, and many others of the important herbivorous animals of the present day, and there is little doubt that the evolution of many animals into orders and forms of to-day was greatly facilitated by the advent of the grass family in the vegetable kingdom.

To-day, of all the plants that cover our earth, grasses rank second to none in importance. In the matter of utility to man and beast, no plant or group of plants has ever played so great a part in the history of the world, and we may well say with Solon Robinson that "Grass is King."

The 10,000 species of the order, of which 1,300 are indigenous to the United States, are distributed throughout all the zones of the earth, and range in size from a few inches in height to veritable forest trees towering sixty feet and more.

Wherever rainfall sufficient to sustain plant life occurs, and at intervals of time not too distant, and with temperatures above freezing at least part of the year, some members of the family will be found. They readily adapt themselves to soil and conditions and flourish and propagate their kind.

Regions that afford ideal conditions are the great prairies of the United States and Canada, southern Russia, Siberia, the grassy plains of South America, and Africa.

### THE BAMBOO IS A GIANT GRASS

Wherever the rainfall is insufficient for forests and the climate is not too arid, grasses prevail over all but the hardiest vegetation. In these areas often more than 90 per cent of the indigenous plant life belongs to the grass order, and, except where cultivation of some species has excluded its rivals, it is not uncommon to find from twenty to sixty distinct species inhabiting almost any locality.

Rice, wheat, corn, oats, barley, and rye are grasses. They enter so largely into the relations of mankind that the country which is best able to supply the world with these necessary articles of food commands the destinies of nations.

Several groups of grasses, like sugarcane, furnish sugar and its by-products. Brooms, paper, rugs, hats, and innumerable articles of commerce are made of grasses, and even houses are built and furnished with their products, not only in darkest Africa, but in many civilized countries.

The giants of the order are the bamboos, the great trunks of which furnish material for an endless number of articles of commercial importance. The pigmies are the various forage grasses, which furnish pasturage for domestic animals and beautify our parks and lawns.

Nor is the story of the merit of the grasses more than half told when it is related that they are "Man's bread and meat; many things good, and most things sweet."

### GRASSES GUARD THE SOIL

Grasses are the overseers of the soil. What is more irresponsible than the sands of the seashore and of the desert? Driven hither and thither by every shifting wave and wind, they now drift here and lodge there. Now they bury forests, now they expose the bones of those who lie asleep in God's Acre, while in the waste spaces of earth the sand storm overwhelms the traveler and his caravan.

If it were not for the grasses, the soil of hillside and plain would be as shifting as the sands of seashore and desert. Every raindrop would be a vehicle on which a grain of the soil would steal a careless ride down to the sea.

But the grasses pin the soil down to its duty. The barren hillside may become a mass of gullies and gulches, but where the grass is master, the soil becomes the faithful servant of man. Even the trees



Photograph by Ernest L. Crandall

#### TWINLEAF AND HEPATICA IN CLEFT OF ROCK: BLACK POND, VIRGINIA

The hepatica is one of the leaders of the floral procession as it comes at the approach of spring, putting out its blossoms even before the leaves venture forth. The twinleaf is often found associated with it in the deep woods, where they together soften the surface of many a cliff.

and the shrubs would not possess a sure footing, did not the grasses help hold down the soil around them.

Though of all plants the most common, the grasses are of all common plants the least known.

The story of the grasses begins long before the age of man. In the geologists' Book of Nature, there are records of grasses that gladdened the face of the earth in the days of the tiny Eohippus, from which the horse is sprung.

Some of the grasses have served man so long and in turn have been served by him that they have become as powerless to live without him as he is unable to get along in comfort without them. Imagine corn and wheat fighting their own way through the years. How soon they would fail without a plow and a harrow and a cultivator to prepare their beds and fight their battles with the weeds.

But other grasses have fought for themselves so many generations that they ask naught of any one. These travel

along the roadsides of the world, sending their seeds hither and yon, until they have effected a foothold by "peaceful penetration" in a thousand communities.

#### HOW GRASSES SEND THEIR SEED ABROAD

The bur grass sends its thorny seed burs far and wide, attached to some passing animal or human being. The terrell grass produces seeds encased in cork-like hulls, which float to new fields on the waters of the brook beside which it grows. Couch grass grows from the root as well as from seed, and sends its spear-pointed rootstalks up through many a new foot of soil.

The beach grass has long since learned the tricks of the sand in attempting to bury all that would bind it, and has worked out a plan for circumventing the resourceful wanderer. It rises out of the sand as fast as the dune can build itself up, and at the same time sends its roots downward until it clinches the dune to solid earth.

Many grasses spread like the couch grass, by runners or rootstocks, having a succession of joints, from each of which arises a shoot that shortly takes root on its own account and in its turn sends out other runners.

Others develop only fibrous roots, and usually, like orchard and panic grasses, are found in bunches or tufts.

The seeds of some species are undestroyed and undigested by the animals that feed on them and get their chance to build a new colony through these carriers.

#### GRASS SEEDS WITH BARBS

Some other kinds of seeds are provided with novel weapons for forcing themselves into the soil. They have a prickly callus which bears stiff hairs growing away from the point like the barbs from the arrow's head. Once the prickly point has penetrated the soil, to draw it out is difficult, since the stiff hairs, rubbed the wrong way, interpose a strenuous objection.

A strong, bent contrivance, known as an awn, and twisted like a rope, is used by some grasses to bury their seeds in the ground. The rope-like twist is influenced by dampness and dryness—it uncoils when damp and coils again when dry. This acts as a motor to drive the seeds into the ground.

In high latitudes and corresponding altitudes, where the ripening of the seeds is uncertain, entire spikelets are transformed into leafy shoots, provided at the base with rootlets ready to grip the ground and grow wherever they fall.

What wonder that, in view of all these devices, one feels like saying of them as Darwin said of the schemes to which the plants resort in order to insure cross-fertilization: "They transcend in incomparable degree the contrivances and adaptations which the most fertile imagination of the most imaginative man could suggest, with unlimited time at his disposal."

#### WHY GRASSES HAVE JOINTS

Every one has noted what are popularly known as the "joints" of grass, but which are technically described as "nodes." Their mission is not, as most people believe, to give strength to the stem, but rather to help it always to stand upright.

The cells of these "nodes" are known as "geotropically sensitive"—attracted to the earth or driven from it. A wind

comes along and bends the grass, so that it becomes unable to resume its upright position. Thereupon the cells in the "node" of the side of the stem that inclines toward the earth begin to lengthen, thus, by imperceptible degrees, lifting the stem to its upright position again.

Nowhere else will one get a more striking picture of why botany seems a hard study to the layman than in the names of the different parts of a stalk of corn. The tassels are the stamens, the ear is a "spike borne in the axils of the leaves," and the grains are "the fertile flowers." The corncob is a "thickened rachis." The chaff covering the cob is "the flowering scale and palet," and the silk forms "the elongated pistils of the flower."

One of the most interesting of all the wars that Nature stages is the struggle between the grasses and trees. Go where the forest and the prairie meet and watch the efforts of the timber to drive wedges into the grasses' lines; and observe the counter-offensives of the grasses in gaining footholds on the tree-ward side of the No Man's Land of the battle zone.

Strategy and tactics alike enter into the struggle. There is nothing of the barbarity of the frost and forest struggle, for neither attempts to dislodge the other; each seeks only to outlast the other and to prevent the other from bringing in reinforcements.

#### UNDER THE EYE OF THE MICROSCOPE

Under the eye of the microscope one may see something of the true glory of the unpretentious grasses, and in the accompanying color series the power of our eyes has been multiplied so that we may discern something of the beauty that lies hidden so deep that the cursory glance is not privileged to behold.

We are told a great deal about the beautiful green of lawn and meadow, but little is known by the layman of the gorgeous and often grotesque flowers, for they can only be seen to advantage under the microscope.

The flowers of most of the smaller grasses are perfect, and their component parts are readily comparable to the larger and better-known flowers.

In grass flowers the petals and sepals are replaced by glumes; there are usually three anthers and an ovary or pistil surmounted by one or two stigmas, these





Photograph by T. E. Marr

## A LILAC-BORDERED DRIVE OF THE ARNOLD ARBORETUM, HARVARD UNIVERSITY

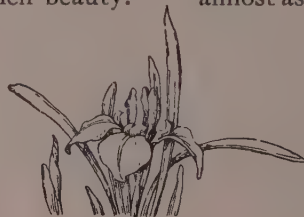
latter often branched and feathery in form.

When seen under the microscope at moderate enlargement and with reflected lighting, the color effect and structure suggest a delicate piece of beaded work profusely jeweled and built into fantastic forms and designs.

From their extreme delicacy it follows that the superficial parts of the flowers are semitransparent, the colors being iridescent or those of one part glowing faintly through the translucent cell walls of the overlying parts. Words are inadequate to do justice to their beauty.

In the smallest enlargements of the accompanying color series of illustrations, one square inch becomes slightly more than four and one-half square feet; in the largest, we are able to look at the grasses under a magnification which is equal to stretching a square inch into twenty and one-quarter square feet, or to expanding one square yard into something more than half an acre.

If one could see familiar objects on a like scale of magnification, a normal man would be half as high as the Washington Monument and a mouse would become almost as big as a horse.



## CHAPTER IV

# FLOWER BIOGRAPHIES

**I**N the preparation of these biographies, the author has followed the nomenclature employed in the book of *Standardized Plant Names*, published under the auspices of the American Joint Committee on Horticultural Nomenclature, representing the American Association of Nurserymen, the Ornamental Growers' Association, the American Society of Landscape Architects, the American Pharmaceutical Association, the American Institute of Park Executives, the Society of American Florists and Ornamental Horticulturists, and other national organizations in the field of applied botany.

The effort of that Committee was to produce a work which would, as far as possible, establish the common names of familiar plants on as sound and certain a basis as their scientific names, and at the same time, by tracing back the literature of each species, to give it the scientific name it was awarded by the botanist who first identified it as a species. Exceptions to this latter rule were made where commercial usage has firmly fixed a name, even though that name may lack botanical warrant.

Furthermore, the Committee sought to eliminate apostrophes and hyphens wherever possible. This sometimes looks as strange to unaccustomed eyes as simplified spelling did when it was proposed. One readily admits that Aaronsbeard cactus, balsamapple, doubleflowering dogwood, figmarigold, glorylily, waterhemlock, skunk cabbage, calicoflower, horsechestnut, princesfeather, and the like are somewhat confusing when one first sees them, but the elimination of hyphens and apostrophes certainly is to be desired.

In the cases of species not represented in *Standardized Plant Names*, and where trade names conflicting with botanical practice were, because of long usage, incorporated in that work, the author has not attempted to apply the rules under which the Committee acted, but has gone to the National Herbarium for authority. Where this, in turn, is silent, Britton and Brown's nomenclature has been accepted.

Thus it will appear that inconsistencies in hyphenation and combination of words occasionally occur. But as *Standardized Plant Names* and the publications of the National Herbarium are standard Government authority, it has been thought wise to follow them wherever they speak.

In order to get a picture of the terms used in these biographies the reader should fix in his mind the idea that all living things are first divided into two kingdoms—the animal and the vegetable. The vegetable kingdom is divided into two subkingdoms, the spore-forming plants and the flowering plants.

The flowering plants are divided into two classes—those bearing naked seeds and those bearing enclosed seeds.

Each class is divided into subclasses, each subclass into orders, each order into families, each family into genera and each genus into species.

Some species, in their turn, are divided into subspecies, or, in cultivated plants, into varieties. A group of species with characteristics which closely relate them form a genus, and a group of genera with common characteristics of a less minute differentiation form a family.

In the arrangement of the flowers they have been grouped according to the families, and out of each family it has been the aim to select as many as possible of representative species, so that if one cannot find in picture and text the exact species he is looking for, he can locate one that closely resembles it.

The spirit in which these biographies has been written is splendidly expressed by William Hamilton Gibson, who wrote:

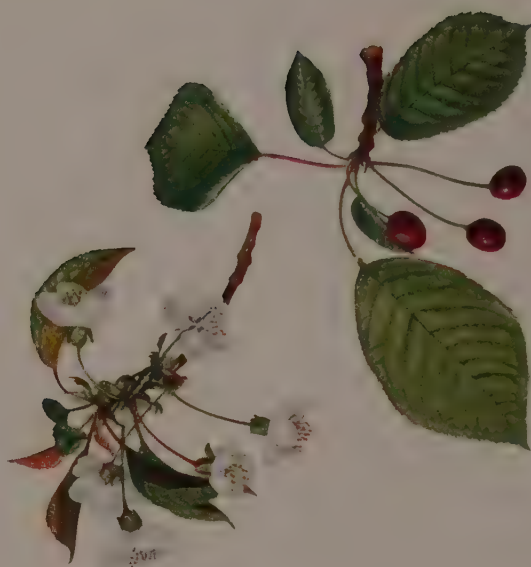
"Let us content ourselves no longer with being mere 'botanists'—historians of structural facts. The flowers are not merely comely or curious vegetable creations,



HAIRY RUELLIA  
*Ruellia ciliosa Pursh*  
ACANTHUS FAMILY  
(See Page 36)



BLACK CHERRY (Upper)  
*Prunus serotina Ehrh.*  
ALMOND FAMILY  
(See Page 37)



MAZZARD (Lower)  
*Prunus avium L.*  
ALMOND FAMILY  
(See Page 37)





AMERICAN PLUM  
*Prunus americana* Marsh.  
ALMOND FAMILY  
(See Page 36)

with colors, odors, petals, stamens and innumerable technical attributes. The wonted insight alike of scientist, philosopher, theologian, and dreamer is now repudiated in the new revelation. Beauty is not 'its own excuse for being' nor was fragrance ever 'wasted on the desert air.' The seer has at last heard and interpreted the voice in the wilderness. The flower is no longer a simple passive victim in the busy bee's sweet pillage, but rather a conscious being, with hopes, aspirations and companionships. The insect is its counterpart. Its fragrance is but a perfumed whisper of welcome, its color is as the wooing blush and rosy lip, its portals are decked for his coming, and its sweet hospitalities humored to his tarrying; and as it speeds its parting affinity, rests content that its life's consummation has been fulfilled."

## ACANTHUS FAMILY

### *Acanthaceae*

The acanthus family consists of some 2,000 species scattered over the entire temperate and tropical world. The leaf of one of the European species is said to have suggested the ornamentation of the Corinthian columns, and has become idealized in Greek and Roman sculpture. The ruellias all closely resemble the one which represents the family in this collection. The waterwillows, of the genus *Dianthera*, are not without considerable likeness to them.

### HAIRY RUELLIA

*Ruellia ciliosa* Pursh

(See Page 34)

The hairy ruellia flourishes in dry soils from New Jersey to Nebraska and southward to the Gulf of Mexico. It is a hardy perennial blossoming from June to September. In addition to its fine, showy flowers it has small cleistogamous ones that look like unopened buds. Some of the carpenter-bees have been seen biting circular pieces out of the corolla and carrying them away to plug up cells in the tunnels they excavate in soft wood as nesting galleries for their young.

## ALMOND FAMILY

### *Amygdalaceae*

In the days of Asa Gray the apples, thorns and haws, and the peaches, cherries and plums were all classed with the rose family. In later classifications this family has been broken up into three families, one of which is the subject of this sketch. Some authorities call it the peach family, others make it the plum family, but the United States Government botanists have called it the almond family. It embraces about 120 known species of trees and shrubs. In addition to those shown in colors and individually described, we find in our latitude such species as the Canada plum, the hortulan or goose plum, the beach plum, the sand cherry, and the chokecherry.

### PEACH BLOSSOM

*Amygdalus persica* L.

Delaware State Flower

(See Page 38)

Who that has wandered through a full-blown peach orchard, feasting the eye upon acres of heavenly pink, can fail to applaud Delaware's decision in making the peach blossom her State flower?

The peach has a deep claim upon national admiration as well as upon local affection, for

it ranks second among all the inhabitants of the American orchard in the money value of its annual crop of fruit. It yields about two bushels for every family in the land, and the product ranges from the delicious Elberta to the small, neglected clingstone of the wayside volunteer tree.

Of ancient lineage is the peach. Indeed, so far back can it be traced that its origin is lost in the mazes of Chinese tradition. Travelers from Persia saw it in China, loved it, and carried it home with them. Here they gave it firm root and endowed it with the name it bears. Thence it traveled westward, a sort of pacemaker for the march of civilization. The Romans, in the days of Claudius, brought it to Italy's shores and thence carried it to Britain. By the time of the discovery of America it had made all Europe its friend and was ready to join the pioneers in shipping for America.

Before the War of 1812 it had crossed the Mississippi and was found as far west as Arkansas. In those days there were many hardy varieties, and where they once gained a foothold they maintained it without human aid. To this day one may journey through the Blue Ridge and Allegheny Mountains and see gnarled and knotty old trees, which must have outlived several generations of men, still bearing their small but delicious clingstone fruit.

### AMERICAN PLUM

*Prunus americana* Marsh.

(See Page 35)

With a flower as fair as any that blooms, even though it is but a small blossom, and fruit that, with its rare transparent coloring, is the soul of beauty, the American plum has a host of friends who rate it high in the order of things delightful to the eye.

This plum is a genuine American, having dwelt here even before the legendary Norsemen came to these shores. And it is of such sturdy stock that it has been widely used to give new life and to infuse new hardiness into the effete plums that have come to us on the wings of commerce from Europe.

Since the scientists have become masters of the art of cross-breeding trees and plants, they have learned to couple the hardy, self-reliant, disease-resisting qualities of the wild species with the improved fruit-producing traits of the tame varieties that have come through centuries of selection. In that way they have given us a long list of new and improved plants.

They go to the desert for clovers to cross with our ordinary stock and give us drought-resisting

pastures; they go to Peru for "new blood" for our potatoes, and we get better varieties than we had before; they take the hardy Japanese bitter orange and cross it with the domesticated orange and get a wider area for its cultivation.

And so the wild plum has been made to do duty in the development of a dozen or more varieties of cultivated plums. Its range is from the Atlantic coast west to the Rocky Mountains and south to the Gulf of Mexico. It blossoms in April and May and bears fruit from August to October, preferring to grow in narrow, open woods and along the borders of streams.

The plums are distinguished from the peaches through their smooth coats and their un wrinkled seeds. It is a curious fact that the varieties derived from the American plum and its related species, and also the Japanese plum, are practically sterile to their own pollen, and do not produce profusely enough for profitable cultivation unless within reach of other varieties for cross-fertilization.

The plum has its own peculiar enemies, both fungus and insect kinds. One sort of fungus which attacks it begins its work soon after the plum sheds its bloom, and as the fruit begins to grow it develops a "plum-pocket" an inch or two long, which presents a hollow, bladder-like appearance. The attacked fruit develops with thickened walls, but with no pit. The fungus also attacks the leaves and stems, causing them to assume a bloated, distorted appearance.

The insect which is the especial enemy of the plum is the curculio, a small, rough, grayish black beetle about one-fifth of an inch long and with two peculiar bumps on its back. The female selects a plum in which to deposit an egg. With her little snout she makes a short slit about one-sixteenth of an inch deep and with her ovipositor places her egg therein. Then she cuts another slit, crescent-shaped, in front of the other one, in such a way as to cause that side of the plum to wither and to prevent the fruit from healing around the egg.

When the larva hatches out, it feeds on the fruit around the stone until the plum, now thoroughly diseased, falls to the ground, carrying it along. It then climbs out of the fruit, digs down about a third of a foot into the ground, and there makes a little cell in which it transforms itself into a pupa. As an adult it emerges, selects a place for hibernation, and sleeps until next year's trees begin to bud, feeding on twigs and buds until the fruit begins to form.

### BLACK CHERRY

*Prunus serotina Ehrh.*

(See Page 34)

Beautiful alike in the texture of its wood and in its appearance both in flowering and fruiting time, the black cherry occurs from Nova Scotia west to the Rocky Mountains and as far south as Peru. It thrives either in rich, moist soils or on rocky cliffs; and while nowhere abundant, numerous groups are found in favorable localities.

The tree grows from 50 to 100 feet high, with reddish brown bark marked with horizontal lines and rough excrescences. In old trees the bark becomes blackish brown; in saplings it is either purplish brown or tinged with green. Of rapid growth, it dies young, but serves well as a nurse tree in forest plantations where luxuriant foliage is desired. The leaves are from two to

five inches long, usually turning pale yellow or orange in the fall, although younger growths frequently take on a garnet hue.

The flowering season of this tree is from April to June. The white blossoms convert the whole crown into a snowy, fragrant cloud. The bark and leaves are aromatic but bitter, owing to the presence of hydrocyanic acid. The same property occurs in the flowers, which on wilting give off a cyanogenetic odor that is quite objectionable to many people, causing severe headache. Cattle have been killed by eating the wilted leaves, and children made ill by eating too many of the cherries.

Few trees figure more in the pharmacopoeia than this one. Chemical analysis of the bark reveals starch, resin, tannin, gallic acid, fatty matter, lignin, red coloring matter, salts of calcium, potassium and iron, a volatile oil, and prussic acid. The bark is widely used in preparations employed in the treatment of hectic fevers, coughs, colds, etc.

The fruit ripens in August and September. The cherries, which are dark purple or black, have a thick skin, dark flesh, and abundant and slightly astringent juice. They are a much-prized food in bird land. The fruit is used extensively in making jellies and as a flavoring for alcoholic liquors; hence its popular names, whiskey cherry, rum cherry, etc. Cherry brandy, cherry bounce, cherry cordial—these are but a few of the nectars manufactured from black cherries.

### MAZZARD

*Prunus avium L.*

(See Page 34)

The mazzard, or sweet cherry, is an immigrant from the region of the Caspian Sea and Euphrates River. Just when it landed in America is not recorded. Its naturalization papers have never been located. But it has been thoroughly Americanized.

The tree has a long list of local names—among them, bird cherry and brandy mazzard. Attaining a height of 75 feet, it has a fine, rounded, pyramidal crown when young, but as it grows older it acquires more portliness, spreading out like a field oak.

Although a wild growth, it has a distinguished progeny that acknowledge and enjoy domestication. The delicious blackheart, the splendid honeyheart and the fine wax, all trace their lineage to the mazzard.

The flowering time of the mazzard is April and May. With their reddish white and pink petals in rich and fragrant profusion, the blossoms have a world of insect visitors who dance and feast away the day amid the abundance of nectar and pollen.

Japan is the cherry country *par excellence*. It has a hundred or more varieties, with white, yellow, pink, and rose-colored blossoms. They grow throughout the length and breadth of the Empire and are planted in vast numbers everywhere—in temples, castle grounds, parks, gardens, along streets and highways, and by ponds and rivers. A three-mile avenue of cherries planted nearly two hundred years ago by the Shogun Yoshimune, in the vicinity of Koganei, some ten miles from Tokyo, forms a sight never to be forgotten by the visitor. Some of the trees are 70 feet tall, with crowns having a spread equal to their height, and with girths of trunk up to 12 feet.





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PEACH BLOSSOM  
*Amygdalus persica* L.  
 ALMOND FAMILY  
 Delaware State Flower  
 (See Page 36)



COMMON AMARANTH  
*Amaranthus hybridus* L.  
 AMARANTH FAMILY  
 (See Page 40)



© N. G. S.

**GOLDEYE-GRASS**  
*Hypoxis hirsuta* (L.) Coville  
 AMARYLLIS FAMILY  
 (See Page 40)



**WESTERN SPIDERLILY**  
*Hymenocallis occidentalis* (Le Conte) Kunth  
 AMARYLLIS FAMILY  
 (See Page 40)

When William Howard Taft visited the Orient on his tour of the world before becoming President, the Japanese gave Mrs. Taft a wonderful collection of flowering cherry trees. These have been planted along the Potomac Speedway in Washington and a century hence that wonderful driveway will rival the great Shogun avenue at Koganei.

### AMARANTH FAMILY

#### *Amaranthaceae*

The amaranth family consists of about 475 species, widely distributed, but most abundant in the Tropics. From the love-lies-bleeding to the prince-feather, the Josephs-coat and the tumble-weed, all the species bear a close structural resemblance to the common amaranth or pigweed, the representative of the family illustrated.

### COMMON AMARANTH

#### *Amaranthus hybridus* L.

(See Page 38)

The common amaranth, like the black-eyed-susan, seems to offer a reversal of the usual course of weeds, for it appears to have come eastward instead of going westward. It gets its name from a Greek term meaning "unfading," in recognition of the fact that its flowers retain their color when dry. It blossoms from July to October, and is abundant in both cultivated and abandoned ground. A native of the southwest, it not only has pushed its way eastward, but has also spread northward and has become a widely dispersed weed, with a vast territory under colonization. Its most familiar name to laymen is probably figweed. One variety of this species is cultivated as a flower in many gardens.

### AMARYLLIS FAMILY

#### *Amaryllidaceae*

This family consists of some 800 species, most of them natives of tropical or semi-tropical countries. Many of its species resemble members of the lily family so closely that some of them pass current in the lay mind as lilies, such as the zephyrlily, the spiderlily, and the belladonna-lily. Several species are perennial, with bulbs or rootstocks. The poets narcissus, the centuryplant, and the false aloe or rattlesnake's-master are members of the family.

### GOLDEYE-GRASS

#### *Hypoxis hirsuta* (L.) Coville

(See Page 39)

The goldeye-grass is a quiet and modest little flower that asks only for a chance to live in the dry open woods and fields, gleaming out of the turf by day as the stars gleam out of the heavens by night. From May to October it shines out of the landscape, and finds but few parts of the United States where it cannot dwell prosperously.

Usually only one of the tiny blossoms on a stalk opens at a time. The others wait their turn, each hoping that those ahead may have the honor of entertaining the tiny bee that delights in their sweets and pays them back in pollen-bearing messenger service. But if a flower "blushes unseen" by the bee for too long a period, it grows tired of "looking and hoping," gives up its ambition for cross-fertilization, and, folding itself as the

Arab folds his tent, brings its own pollen-laden anthers into contact with its own stigma, and thus produces self-fertilization as a last resort against death without posterity.

But if the bee comes the flower is happy, and offers its visitor not only its nectar, but gives it pollen to carry home as flour for the beebread which the bee's tiny babies must have.

Nature's frugality is revealed in the case of the goldeye-grass. When its flower is upright and almost closed, she paints its outside with green color; but when the blossom is spread out the inner side of the petals display the chief decoration.

### WESTERN SPIDERLILY

#### *Hymenocallis occidentalis* (Le Conte) Kunth

(See Page 39)

The spiderlily, with its very long stamens and its peculiarly placed anthers looks like the daddy longlegs of the flower world. The species that come into our territory are few. They are mostly tall, bulbous herbs, and, like their tropical cousins, are exclusively American. They get their genus name from the Greek, the term signifying "beautiful membrane" and referring to their strikingly handsome crowns. The spiderlilies flower in late summer.

### APPLE FAMILY

#### *Malaceae*

The trees and shrubs that the more recent authorities have set apart into the apple family were all formerly included in the rose family. Besides the members illustrated in this series of flower paintings, familiar species included in the family are the several mountain-ashes, pears, crab apples, shadblows, hawthorns and thorns. The family embraces about 500 species.

### APPLE AND BLOSSOM

#### *Malus sylvestris* Mill.

Arkansas and Michigan State Flower

(See Page 42)

There are a few commonwealths which, while agreeing that a thing of beauty is a joy forever, are yet utilitarian enough to hold that when a delight to the eye ripens into a joy to the palate it is to be prized above all other forms of loveliness. Arkansas and Michigan registered this view when they chose the apple blossom to be queen of their flower carnivals.

Certainly, whoever has seen an apple orchard in full bloom, with its whole acres of pink and white petals set in a framework of green, will not need to wonder why two legislatures should prize especially the beauty of the apple blossom.

It is one of the progressives of the floral world and wants a hardy, strong, resistant posterity, so it takes careful precaution to insure cross-fertilization. The stigmas reach maturity before the anthers begin to shed their pollen, and in this way the insects have every opportunity to bring pollen from another blossom. But if the bees and the butterflies chance to overlook one, it retains its pistils until its own anthers are developed and can enable it to produce an apple.

Perhaps nowhere else do we get a more striking picture of what selection may accomplish than in the case of the apple tree and its fruit. Contrast the smooth and spreading winesap tree in a well-



cultivated orchard with the small, knotty-limbed, scaly-wooded European crab tree. Isn't it almost like contrasting a stately elm with a dwarfed hawthorn? And yet, is there as much difference between the ancestral crab and the descendant winesap tree as there is between their fruits?

The crab apple of Europe, though a gnarled, knotty, acid-fruit tree, is the Adam of a wonderful race. An orchardist recently counted more than three hundred varieties of apples, all of them direct descendants of this sturdy pioneer.

What could bear better testimony to the value of apples than the poetical proverbs which have crept into our language celebrating their qualities! "To eat an apple before going to bed will make the doctor beg his bread," says one of these; and another declares, "An apple eaten every day will send one's doctor far away." An old Saxon coronation ceremony carried with it a benediction after this fashion, "May this land be filled with apples."

In history, tradition, and mysticism the apple has played a distinguished rôle. Through it, we are told, "came man's first disobedience," which "brought death into the world and all our woe." Juno gave Jupiter an apple on their wedding day, and a poorly thrown one was the immediate cause of the ruin of Troy. Paris gave a golden apple to Venus; Atalanta lost her race by stopping to pick up one, and the fair fruits of the Hesperides were the apples of gold.

In the west of England the village girls used to gather crab apples and mark them with the initials of their beaux. The ones that were most nearly perfect on St. Michaelmas Day were supposed to represent the lovers who would make the best husbands. In our own land to this day girls tell their fortunes on Hallowe'en by naming the apples and counting the seeds. An apple paring thrown over the shoulder on that fateful night will form the initial of the future mate.

#### DOWNY HAWTHORN

*Crataegus mollis* (T. & G.) Scheele

Missouri State Flower

(See Page 47)

When Missouri came to adopt a State flower the legislature was guided by the recommendations of the Daughters of the American Revolution of that State. The agitation of the matter began following the publication of the article on State flowers in the NATIONAL GEOGRAPHIC MAGAZINE in 1917. The daisy was at first recommended by a vote of the conference of the Daughters in 1919, but the following day a motion to rescind that action because the daisy was not a native and was the emblem of other States was passed. A glowing tribute to the red haw as a native flower whose berries were prized by the pioneers for making jellies and whose wood served them as material for shuttles used in weaving homespun resulted in the adoption of that flower and a recommendation that the legislature accept it as the Missouri State flower.

This was done in 1923, and the act specifies *Crataegus* as the genus. This group contains perhaps a score or more of species indigenous to Missouri, but the Daughters of the American Revolution generally favor *C. mollis* or *C. crusgalli*—respectively the downy hawthorn and the cockspur thorn in popular nomenclature, both being included in the term "red haw" as used by laymen.

It is said that more birds nest in the dense foliage of the Missouri hawthorns than in all other native trees, and that the red cardinal and the brown thrasher particularly prefer it. The school children use the hawthorn blossoms to decorate their school rooms in the spring and the berries in the fall.

#### FLESHY HAWTHORN

*Crataegus succulenta* Schrader

(See Page 47)

This plant, growing as a low shrub in some localities and as a small tree in other regions, has a range extending from Nova Scotia through Quebec and Ontario to Minnesota, and thence southeastward to the mountains of Virginia. It has a preference for rich uplands and limestone soil.

The weapons that give the fleshy hawthorn its vernacular name of longspine thorn are numerous and grow from 1½ to 3½ inches long. They are slender, shining chestnut-brown spines, almost as sharp as needles. The flowers, appearing in May, form in white clusters and call the insect host with both appeal of beauty and allurements of fragrance. They have a great many visitors, the bees coming more frequently than the butterflies.

The berries develop in September. They are garnet-colored and translucent, with a shiny, polished appearance. They are not berries, from a scientific standpoint, but belong to the apple type of fruits. They fall off when the frosts become frequent, while the leaves gradually assume that coloring in which red and green and yellow are mixed in varying proportions and with gorgeous effect.

The fleshy hawthorns are sometimes used as a stock upon which to graft apples and other pome fruits. They are rapid growers, the shoot of a single year being sufficiently large to serve as a walking stick. Prior to 1899 there were about 65 species of hawthorns known, of which some 25 were in North America. At present more than 1,000 species have been described.

#### DOWNY SHADBLOW

*Amelanchier canadensis* (L.) Medic.

(See Page 43)

The downy shadblow, a cousin of the chokeberry, the apple, and the hawthorn, has green, toothed leaves, gray and sepia-brown twigs, and red and pink fruit. It is a beauty in the fall, just as it is in the spring, when the white, pink-trimmed blossoms appear. Among its local names are boxwood, Canadian medlar, Juneberry, sand cherry, serviceberry, sugarberry, sugar pear, snowy mespilus, and May cherry.

This species is a shrub or small tree varying from 8 to 25 feet in height, usually attaining its maximum growth in swamps and along river courses. Its habitat extends from Newfoundland to the Gulf of Mexico and throughout the Middle West. The fruit forms in June and July, the berries varying in size from that of a currant to that of a morello cherry. When they are in season, boys, robins, and bears alike feast upon them. The color of the fruit varies from crimson, through magenta, to purple or black.

The wood of the shadblow is known as "lance-wood," and many a fishing pole and umbrella handle have been fashioned from it. The Indians



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APPLE and BLOSSOM  
*Malus sylvestris* Mill.  
APPLE FAMILY  
Arkansas and Michigan State Flower  
(See Page 40)



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DOWNY SHADBLOW (Upper)  
*Amelanchier canadensis* (L.) Medic.  
 APPLE FAMILY  
 (See Page 41)

AMERICAN MOUNTAIN-ASH (Lower)  
*Sorbus americana* Marsh.  
 APPLE FAMILY  
 (See Page 44)



often used it for bows and arrows, and it is in considerable demand for tool handles.

In some communities the shadblow is cultivated, being propagated from seeds as readily as apples. It has been found a satisfactory stock upon which to graft the pear and the quince, both of these fruits maturing earlier when so grafted and the resulting trees enduring the winter more readily.

The pemmican of the Indians was composed of deer or buffalo meat dried and pounded to a powder, to which was added dried Shadblow berries or blueberries, the mixture being then stirred into boiling fat. When cooled, the mass was molded into cakes. When the Lewis and Clark expedition made the first overland journey to the Pacific Ocean, their provisions ran short while in the region of the upper Missouri River, and it was one of the *Amelanchier* species, *alnifolia*, that came to their rescue with a bountiful supply of luscious berries.

### AMERICAN MOUNTAIN-ASH

*Sorbus americana* Marsh.

(See Page 43)

The outstanding fact about the mountain-ash is that it is really not an ash at all, but belongs to the apple family.

There are about 10 species embraced in the *Sorbus* group. Flourishing from Labrador to Manitoba, and reaching south of the latitude of New York and the Great Lakes only where it can find mountains, the tree grows on rocky bluffs with wild plums and straggling beeches, attaining a height of 20 to 40 feet.

The flowers appear in May and June in great masses or cymes of white. The leaf turns a bright, clear yellow in the fall. The berries, to which many a bird has flown for salvation in a snowy spell, remain on the trees all winter. They are sometimes used in making astringent home remedies and occasionally are eaten raw, though said to be harsh in flavor, with a nauseous undertaste, which very few people relish. Infused with water, they furnish a pleasant subacid beverage, and by distillation, a powerful spirit.

The aliases of the mountain-ash are as numerous as those of a yeggman and as suggestive as those of a hobo. Dogberry, fowler's service, Indian-mozamize, round-wood, witch-wood, quick-beam, Rowan-tree, wichen, whistle-wood, and wild ash are a few of the names assigned to it in the vernacular.

The fruit of the mountain-ash is not, strictly speaking, a berry. Rather it is a pome, or apple-like fruit.

### CHOKEBERRIES

*Aronia melanocarpa* (Michx.) Britton

*Aronia atropurpurea* Britton

*Aronia arbutifolia* (L.) Ell.

(See Page 46)

Botanists are not agreed as to the classification of the black, purple, and red chokeberries. Some assign all to a single species; others regard the red as a distinct species and the purple and black as variations of another. Some say all belong to the *Sorbus* group of plants, with which the mountain-ash is identified, while others include them in the *Pyrus* group, to which the several pears belong.

The berries of all three have the common quality of astringency, their everyday name being a tribute to their power to constrict the throats of those who eat them. They occur in moist thickets and swamps from New England and Minnesota to the Gulf of Mexico, growing from two to six feet high.

The black species is found in altitudes as great as 6,000 feet. Its flowers appear in early summer and its berries in August, shriveling and dropping early. The purple species blossoms from April to June and its berries mature in September. The seasons of the red variety are but little different.

### ARUM FAMILY

*Araceae*

Embracing about 900 species, most of them dwelling in tropical lands, with a few hardy ones able to survive the winters of the higher latitudes, the arum family has some attractive members living in the United States. The dragonroot, the wild calla, and the arrow-arum are familiar species in addition to the ones illustrated.

### JACK-IN-THE-PULPIT

*Arisaema triphyllum* (L.) Torr.

(See Page 50)

Jack-in-the-pulpit is one of the denizens of flower land that seldom ventures out of the forest. He loves moist, rich ground, blossoms from April to June, and claims as his own all of that vast territory from Nova Scotia westward to Minnesota and southward to the Gulf of Mexico.

What country boy has not been tempted into tasting of Indian-turnip root, to his sorrow and to the great burning of his mouth? And why should he not suffer, for that root which has been ruthlessly torn up represents the hard-earned savings of Jack-in-the-pulpit. During the happy days of summer he labors hard to pay the premium on his life insurance, so that in the spring to follow, when he is dead and gone, his heirs may rise up possessed of a "grubstake" that will afford them provender until they can win their own place in the world.

Jack-in-the-pulpit got his name through the resemblance of the little hooded house of green which he builds to the old-time pulpits, which had a sort of hood over them.

He received his name of Indian-turnip through the fact that the Indians habitually raided his rootstock insurance, and, boiling the "bite" out of it, made of it what they considered a delectable dish.

Our floral pulpiter is gradually copying the ways of the most disreputable member of his family, instead of trying to live up to the beautiful reputation of his fair cousin, the calla. He has so arranged his pulpit that once a tiny fly or ant or bee gets in, it stands a good chance of drowning, for after a hard shower the bottom of the pulpit is likely to be covered with water, and the walls afford poor footholds.

### SKUNKCABBAGE

*Spathyema feotida* (L.) Raf.

(See Page 51)

This evil-smelling, insect-baiting relative of the proud calla lily and the savory sweetflag, lives in swamps and wet ground over a territory that

reaches from the Atlantic seaboard to and beyond the Mississippi River and from Nova Scotia to the Gulf of Mexico. Its flowering season is from February to April, and whoever invades its precincts about that time is likely to debate with himself whether it is the odor of putrid meat, cooking garlic, or aroused skunk that assails his nostrils. If he thinks it is a combination of all three that frets his nose, he will not be much mistaken.

The skunkcabbage has a habit of appearing too early in the season to be served by the bees and butterflies. They are still hibernating in egg or imago when the skunkcabbage fares forth for its new career. Only the flesh flies are plebeian enough to rise so early from the winter's snooze.

And as the skunkcabbage needs insect visitors, it will not be too "picky and choosy." It will prepare a feast suitable for the wayfarers of the day, and if they like limburger cheese better than nectar they shall have it. And so the unsavory odor that disgusts us and delights them is prepared and set out in vegetable tissue that has the guise as well as the odor of decaying meat.

The spiders have learned that the flesh flies congregate in the skunkcabbage's pantry, and they build webs galore over the entrances to the spathes, so as to trap them the more readily.

So also, some Nature fairy whispered into the ear of some of the swamp-dwelling birds that their nests would be safe in the hollow of the skunkcabbages, and the lizards got word by grapevine telegraph that their enemies would stay away if they dwelt beneath the skunkcabbage. Cattle and sheep have been taught alike by its bad odor and its acrid juices to give the foetid plant a wide berth.

### GOLDENCLUB

*Orontium aquaticum* L.

(See Page 54)

The goldenclub has a range that reaches from New England to the Gulf of Mexico, and is usually found in shallow ponds, standing water and swamps. The sight of a large mass of these flowers is one not soon to be forgotten. The species lacks the spathe characteristic of the beautiful white robe of the calla lily, or the bright green of the "pulpit" of its other cousin, the flower land preacher. But this is because it has cast off its formal clothes and appears only in its bathing suit when it commands our attention. It seems to have found that it does not need "block type" to advertise its wares to its customers. Like the sweetflag, the goldenclub, inhabiting watery ground, has to rely mainly on gnats and other minute insects as its intermediaries in the process of fertilization, and has, therefore, arranged its flowers in large masses of very small individuals, which are readily fertilized by these insects walking about over them.

### SWEETFLAG

*Acorus calamus* L.

(See Page 54)

Though a cousin of Jack-in-the-pulpit and the skunkcabbage, the sweetflag or calamus has none of the insect-baiting habits of the former and none of the evil-smelling properties of the latter. Indeed, it has a record as an ingredient of incense that goes far back beyond King Tutankhamen to times antedating the custom of burning incense by the people of Israel.

It is a cosmopolite, spreading over most parts of the North Temperate Zone, and thrives in swamps and along streams. The pungent, though pleasant, flavor of calamus root is known to almost every boy.

The flowering time of the sweetflag occurs in June and July, the tiny, inconspicuous flowers completely covering a tapering, cylindrical spadix, growing out at a sharp angle to the flat stem. If these tiny flowerets be examined under a magnifying glass, it will be found that each one is a perfect little lily that has sacrificed much to live in the crowded community of the spike. Its six petals have been reduced to mere scales, each scale protecting a stamen.

The close crowding of the tiny flowerets has good reason behind it. The plant grows near the water, and hence must depend on tiny gnats, minute beetles, and other small members of the insect community for fertilization.

But even such teamwork does not suffice, for propagation takes place much oftener through the rootstocks than through the seeds produced on the spike. When about half matured, the spike is tender and edible and the interior of the stalk is sweet.

The root of the sweetflag has medicinal properties, and is used, when dried or candied, as a remedy for dyspepsia and as a stimulant and tonic for feeble digestion. It is powdered and used as an insecticide in India and Ceylon, and yields a volatile oil used in the manufacture of perfumery. The Greeks and the Babylonians knew of its properties and employed them alike in medicine and in incense.

## ASTER FAMILY

### *Asteraceae*

The aster family is perhaps the largest of all the flower families. Whether it shall be called the aster family or the thistle family or the composite family depends on what authority one consults. Also, whether it shall be held to embrace the dandelion, the lettuce, the chicory and related plants depends on whether one consults Gray or other authorities. Most recent botanists set off the group of composite plants that have a milky juice and designate them as the chicory family.

Even with the latter group of plants eliminated, the aster family embraces some 10,000 species, divided into some 800 genera. It includes such groups as the ironweeds, the several kinds of elephant's-foot, the thoroughworts, the bonesets, the asters, the goldenrods, the thistles, the arnicas, the sagebrushes, the mugworts, the wormwoods, the tansies, the camomiles, the daisies, the chrysanthemums, the coneflowers, the yarrows, and the sunflowers.

The members of the aster family are the Napoleons of finance and industry in the flower world. If there were politics and politicians among the flowers, there would be a lively campaign against the "trusts," for the asters seem bent upon a "corner" in the nectar trade. They are efficiency experts, knowing how to crowd hundreds of blossoms into a single head, usually with brilliant ray flowers at the edge to attract their insect customers. It has been estimated that one-ninth of all the flowering plants of the earth have joined the composite group, and that it includes in the United States and Canada alone more than 1,600 species.



RED CHOKEBERRY  
*Aronia arbutifolia* (L.) Ell.  
 APPLE FAMILY  
 (See Page 44)



CHOKEBERRIES  
*Aronia melanocarpa* (Michx.) Britton (Upper)  
*Aronia atropurpurea* Britton (Lower)  
 APPLE FAMILY  
 (See Page 44)





DOWNY HAWTHORN  
*Crataegus mollis* (T. & G.) Scheele  
 APPLE FAMILY  
 Missouri State Flower  
 (See Page 41)



FLESHY HAWTHORN  
*Crataegus succulenta* Schrader  
 APPLE FAMILY  
 (See Page 41)

## OLDFIELD GOLDENROD

*Solidago nemoralis* Ait.

Nebraska and Alabama State Flower

(See Page 67)

By legislative action the goldenrod is the State flower of Nebraska, and by school children vote, the representative of Alabama in the bouquet of elect flowers.

Not only is the goldenrod a member of one of the most widely known and versatile flower families of the world, but its own household is made up of a large number of brothers and sisters. We are told that there are 85 species of goldenrod in the United States. A few of them have crossed the border into Mexico and some have even invaded South America, thus indicating that there is such a doctrine as "manifest destiny" in flower land as well as in international politics. Over in Europe there are people who like our goldenrods so well that they grow them in their gardens, as we ourselves would surely do were it not for their wonderful ability to shift for themselves.

All of these species are grouped as members of the genus *Solidago*, a name which comes to us from ancient Rome, where they thought the goldenrod a possessor of healing powers strong enough to entitle it to be called the "makes whole" plant. The species range from the stout goldenrod, otherwise *Solidago squarrosa*, which lives up to its name, and the showy goldenrod, which does likewise, to the sweet-scented goldenrod, from which a delightful drink may be brewed, and the slender goldenrod, otherwise *Solidago tenuifolia*. There is one species which an Irishman must have named, for it is called the white goldenrod. It is just about as logical to speak of a white black-bird, and the botanists get around the inconsistency of its color by calling it *Solidago bicolor*.

There is also a species for every locality—the "alpine" for the mountains, the "seaside" for the brackish beach, the "bog" for the deep, soft wood, the "swamp" for the waste places.

The goldenrod is one of the merchant princes of the plant world. "Quick sales and short profits" is its motto, and it has arranged its wares so that the insects may find whatever they want and in any quantity. The result is that the field covered with goldenrod is an American entomologist's paradise.

In the days of Queen Elizabeth the goldenrods had a great reputation for healing wounds and were imported in considerable quantities and sold in the London markets in powder form at half a crown a pound. In range they cover the continent with their cloth of gold. North, south, east, west, on mountain and by sea, in dry field and in wet swamp, they flourish in their season and warm every landscape with their rich color.

## OXEYE DAISY

*Chrysanthemum leucanthemum* L.

North Carolina State Flower

(See Page 55)

So popular is the white oxeye daisy in North Carolina that neither a legislature nor the school children had to express formally the State's choice. The unanimous tribute of a "common consent" award was paid it by the people of the Tar Heel State; and if the whole catalogue of Nature's blossoming children had been ransacked there

could not have been found a hardier flower, a more persistent warrior in behalf of its right to exist, or a better loved or worse hated plant, than the oxeye daisy. Flowering from May to November, it has adjusted its economy to the necessities of its perpetuation in a way admirable to the student of flower resources and baffling to the good farmer who so heartily dislikes to have his field dressed in the full regalia of poor farming.

To the daisy a home in the woods is like an East Side tenement to one who has lived on Fifth Avenue. It can never content itself in the shade and the solitude of the forest. The meadow, the pasture, the hayfield, the roadside—these are places where it likes to grow; and to grow there it has to fight a battle with the farmer. It must be able to set some seed before haying time, else how could it continue its hold in the hayfield? Then, too, it must vary its period of blooming, for what farmer who prides himself on well-kept pastures would permit daisies to crowd out his clover if they could be overcome in a single mowing?

But with all its "weedy rôle" in the eyes of the farmer, there is beauty in the oxeye daisy and as much sentiment. What maiden has not on its "petals" told her fortune with the formula, "He loves me, he loves me not," or has failed to find a blossom that would declare to her that her Prince Charming's heart was at her feet?

But whether it be with the eyes of the farmer that you see the daisy, beholding only its persistent invasion of his domains, or whether with the eye of the beauty lover who is called by admiration and not to battle, or whether with the eye of the sentimental who love it for the fortunes it has told, the daisy is by all awarded the honor of being an alien that has no hyphen in its disposition. It is an immigrant, unlike its closest relative, the black-eyed-susan; but it has all the enterprise, all the spirit of winning its way in the world, all the Yankee resourcefulness of a flower to the manner born. It long ago found Europe too crowded for comfort and discovered that it could come to America as a stowaway. Over here it traveled in wagons, by automobile, by river steamboats, on railroad trains, any way that offered it the chance to find a new field in which to lay the foundations of a new colony.

The oxeye daisy's prosperity is due no less to the form of its bloom than to the tactics it employs in fighting for its position in the field. The white "petals" are not petals at all; they are sterile florets, gaily bedecked in white, waving a welcome to the passing bees and butterflies, whom they invite to the feast which the yellow florets have prepared for them. Like all other progressive flowers, the oxeye daisy has designed ways to insure itself the boon of cross-fertilization. The two arms of the pistil are kept tightly closed until the pollen is gone; then they open up and become sticky, so that the bee which comes their way from another blossom must leave with them some of the grains of pollen it has gathered elsewhere.

## BLACK-EYED-SUSAN

*Rudbeckia hirta* L.

Maryland State Flower

(See Page 65)

Fighting her way across the American Continent, black-eyed-susan has proved the master of the allied forces of man and Nature. In the competition of life she has been able to make a

home wherever she sets her foot, and neither the rivalries of the field nor the laws and labors of man have been able to hold her in check.

She loves dry fields and open, sunny places, and can hold her own with the white oxeye daisy and the wild carrot in dry weather. Her flowering season is long, opening in May and closing in September. She is one of the little vagrants that has traveled from the West to the East along the highways of commerce. In years gone by much clover seed was shipped out of the West, and black-eyed-susan hoboed her way along with it. Most of the weeds of the field have traveled along with migrating people, from the East to the West; but black-eyed-susan has reversed the natural order, and already has secured a footing in European flower gardens, if not in European fields. As one authority puts it, "By the middle of July our dry meadows are merry with black-eyed-susans, which are laughing from every corner and keeping up a gay midsummer carnival in company with the yellow lily and brilliant milkweeds. They seem to live in long days of blazing sunlight and are veritable salamanders among the flowers."

Black-eyed-susan is one of the most liberal of all the entertainers in the flower world. Bees, wasps, flies, butterflies, and beetles all gather around her festive board and although the nectar deep down in her tubular brown florets can be found only by the insect with a slender tongue, the pollen is accessible to all.

Being so richly provided with methods that assure fertilization to her blossom, black-eyed-susan inevitably sets many seeds. The result would be a prolific reproduction, even though there were not artificial agencies upon which she could rely for dissemination. The farmer who stores hay in his barn carries the seeds of this plant wherever that hay may go, and the one who sows grass seed of any kind, unless he is exceptionally careful to have his seed free from filth, will spread black-eyed-susan broadcast along with his grasses.

In the days of the World War, we heard much concerning barbed-wire entanglements and all sorts of defensive works of a similar nature. Black-eyed-susan long ago learned to defend herself from would-be pilferers in much the same way. If you will observe her closely you will find her stem full of tiny thistle-like bristles. No creeping creature stands a show of getting past these defenses and up to the nectaries because this flower long generations ago learned that they are not able to serve as pollen bearers in exchange for her nectar.

### SAGEBRUSH

*Artemisia tridentata* Nutt.

Nevada State Flower

(See Page 55)

Nevada's floral queen is not famed for a retiring disposition; neither has it any especial beauty; nor yet is it distinguished for its aggressiveness or the usefulness of its product. Rather, it is content to soften the sternness of the unoccupied, semiarid lands of the Southwest until the farmer comes along. Into his ear the sagebrush whispers that where it grows alfalfa will flourish. After imparting this information, the self-sacrificing bush is content to endure the woes of surrendering its home. The farmer, using a railroad rail or a plank drag, clears his ground of this plant, irrigates it, and puts in the sagebrush's stead a field of alfalfa.

The sagebrush's immediate cousins are widely distributed. They are known as the *Artemisias*, and there are a host of them, many with important uses in the economy of civilization. *Artemisia absinthium* is popularly known as common wormwood; from it comes the bitter, aromatic liquor known as *eau* or *crème d'absinthe*. Many of its cousins grow in Asia and Europe, including the mugwort, used by the Germans as a seasoning in cookery; southernwood, used by the British to drive away moths from linen and woollens and to force newly-swarmed bees, which have a peculiar antipathy for it, into the hive; and tarragon, used by the Russians as an ingredient for pickling and in the preparation of fish sauce.

Sagebrush itself is found as far east as Colorado and is one of the dominating shrubs of the Great Basin which lies between the Rockies and the Sierra Nevada Mountains.

The *Artemisias* derive their name from Artemisia, the beautiful wife of King Mausolus. The magnificent tomb she erected to his memory at Halicarnassus has given the name mausoleum to every elaborate tomb from that day to this.

### COMMON SUNFLOWER

*Helianthus annuus* L.

Kansas State Flower

(See Page 66)

It is fitting that such a genuinely American Commonwealth as Kansas should choose a genuinely American flower to represent it at home and abroad. And the sunflower is such, for the Old World's eyes never fell upon it until the days when the exploration of the New World began. The Incas of Peru and the Hurons of our own country alike were enjoying it as a cultivated crop when the white man first visited them. They used it much as the bamboo growers use the bamboo—as a Jack of all Services. Its seeds they found useful as food and as the raw material of a homemade hair oil; its petals were utilized in the manufacture of a yellow dye; its leaves served them as fodder and from its stalk they secured a thread.

The wild sunflower is the one that gave Kansas the title of "The Sunflower State." Its range extends from the Atlantic seaboard, through Kansas, and from the Northwestern Territory to the Gulf of Mexico.

Like the potato, which is the world's most productive food crop, like maize, which has marched to the ends of the earth, and like the tomato, which has come to enjoy a place all its own in the culinary establishments of civilization, the sunflower is a native American gone forth to render rich recompense to other nations and other continents for the plants they have given us. In China its fiber is used as an adulterant of silk; in southern Russia the seeds are widely employed both in making oil and as a substitute for our peanut. The pocketful of sunflower seed plays the same rôle in some parts of Russia as the bag of peanuts here. Much of the sunflower oil produced in Russia is used in making soaps and candles. Europe, Asia, and Africa all cultivate this plant.

When the Spaniards first visited Peru they found it as much the national flower of the Incas as it to-day is the State flower of Kansas. The Incas gave it a deeper reverence because of its resemblance to the radiant sun. In their temples the priestesses wore sunflowers on their bosoms, carried them in lieu of tapers, and otherwise used them in their





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JACK-IN-THE-PULPIT  
*Arisaema triphyllum* (L.) Torr.  
ARUM FAMILY  
(See Page 44)



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SKUNKCABBAGE  
*Spathyema foetida* (L.) Raf.  
ARUM FAMILY  
(See Page 44)

services. The Spanish invaders found many images of sunflowers wrought with exquisite workmanship in pure virgin gold. These wonderful images, among many others, helped to excite the cupidity of the conquistadors and thus to bring about the downfall of the Incas.

In North America there are about 40 known species of this plant. South America has about 20 species that do not exist on our own continent.

### COMMON YARROW

*Achillea millefolium* L.

(See Page 68)

Yarrow has as many different names as a Modern Raffles. Some call it milfoil, crediting it with having a thousand leaves, just as rural folk credit a centipede with being a thousand-leg worm. Others call it old-man's-pepper, by reason of its spicy aroma, and others nose-bleed, by reason of its nosebleed-producing qualities. Still others call it soldier's-woundwort, by reason of its efficacy as a homely remedy in the treatment of wounds.

It derives its official Latin name from the Greek warrior Achilles. We are told that Chiron, the centaur, taught its virtues to the ravager of ancient Troy, who made from it an ointment with which to heal his wounded myrmidons.

The yarrow is widely used in the remote rural districts as a love charm. A girl wraps it in flannel and puts it under her pillow, repeating a verse. The next day she puts it into her shoe and asks it to guide her footsteps to her future husband. The first single man she meets is supposed to be the one it recommends to her.

The yarrow is a charming flower to some. To the city-born it is an exquisite, lacy flower, so much so that it is sometimes cultivated. In the Azores it is cultivated as the lace plant, and one writer reports having seen it growing on the lawn of an exclusive home on Fifth Avenue, New York. But to the farmer whose hayfields it invades, and to his sturdy sons who must work many a hot summer day to keep it from running away with the farm, it loses all its poetry and romance and grace and becomes a living sign of a poor farmer—a weed of the worst type.

When one considers how the yarrow chooses the grass fields as its favorite habitat and makes the farmer help to propagate it by cutting it with his hay, and thus scattering its seeds far and wide, he cannot but reflect upon the wonderful determination with which it fights extermination.

Indeed, the more "pestiferous" a weed is to a farmer, the greater have been its achievements in the way of overcoming obstacles. One would admire greatly their gameness, their generalship, and their spirit of "facing their fortunes like a man" were not their triumphs the farmer's defeats.

Take purslane, lambs-quarters, and a dozen other weeds. They need cultivation to thrive well, so they steal into garden and truck patch and compel the gardener to cultivate them while he cultivates his vegetables.

Then there are corncockle, garlic, and innumerable other weeds that like nothing better than to get into a wheat field and get cut along with the wheat. The farmer must thresh them with his wheat, and thus they get sown in well-prepared soil once again.

Nearly all the weeds have learned to fit themselves to those farm operations which are best suited for their spread. That is the reason that

yarrow gets such a firm hold wherever it goes. The farmer cannot "make hay" without "making yarrow," too.

The insect world likes the yarrow if the farming population does not. More than 120 species of bees and butterflies visited a watched plant in a single day. Its nectar stands seem as popular in insectdom as the pink lemonade stand at a circus or a soda fountain at a corner drug store on a hot day.

### COMMON TANSY

*Tanacetum vulgare* L.

(See Page 59)

The tansy is an example of a flower that has not yet learned the art of display in advertising. By an effective use of white or colored rays or petals, the oxeye daisy, the black-eyed-susan, and other flowers can accomplish more with one head on a branch than the tansy does with a dozen. Many plants have 40 of these heads, and each head contains some 400 florets, 16,000 florets to a plant.

This flower grows from 18 to 40 inches tall, loves the roadsides, and ranges from Nova Scotia to North Carolina and Missouri. It blooms from July to September.

Like many another plant, the tansy came to America as a cultivated herb. The colonists thought they could not do without their tansy herbs and bitters, and least of all without their tansy tea. But, once here, it tired of the coddling of the garden and gave ear to the call of the wild.

Under a lens the leaves are seen to be dotted with glands containing the oil that gives the plant its strongly aromatic flavor and scent. It is this oil that has given the tansy its value in medicine and cookery.

### NEW ENGLAND ASTER

*Aster novae-angliae* L.

(See Page 62)

Like its cousin the thistle, and like the daisy and the sunflower, the aster is one of the most civilized of flower peoples; so well have they adapted themselves to the necessity of varying environment that they have been able to travel around the earth and to make themselves at home wherever they go.

They ask odds of nobody. Through countless generations they studied the best methods of insuring their survival against the fiercest competition, and finally developed the idea of the composite flower. It was like a Forty-niner striking a bonanza mine! And so we find them wholly self-reliant, self-sufficient, and ready to fight all comers for their right to a place in the sun of existence.

When they started out they were like the grass—dependent upon the wind to carry their pollen; but as they journeyed down through the ages they gradually discovered that the wind was not always a trustworthy messenger. The more progressive among them decided to employ insects instead of breezes as their pollen bearers.

Their first "help wanted" advertisements were a few dainty flower petals, but this innovation was so successful that they began to do a land office business. They found that myriad armies of insects were ready to be mustered into their service.

So successful, indeed, was the experiment that they decided to extend their business still fur-



ther, and to employ in their appeal for recruits display ads in the shape of great groups of flowers instead of want ads in the shape of isolated blossoms.

And their second adventure was as successful as the first. They offered high wages in easily reached and abundant nectar of the best quality, with the result that they were able to command the services of the most reliable of insect messengers.

Their brands of nectar were so well advertised and maintained such a high standard of purity that their big page ads drew vast hordes of winged Mercuries, and, having become the biggest users of printers' ink in flower land, their respective establishments grew and grew until their names became household words in insectdom.

To-day they are the people of flower land with a vision. The daisy army transforms millions of acres into white and gold in summer, while in autumn the aster and goldenrod proclaim their triumph through millions of acres of blue and yellow.

There are about 120 species of asters in the United States. The New England aster occurs commonly in New England, as its name implies; but it has extended its territorial possessions beyond that area, appearing in the maritime provinces of Canada and as far south as the Gulf of Mexico. Its flowering season is from August to October, and its favorite habitat swamps, moist fields, and roadsides.

#### NEW YORK ASTER

*Aster novibelgi* L.

(See Page 55)

With flowers ranging from pale violet to blue violet, the New York aster, sometimes known as the willowleaf aster, lays claim through Gray, to being "the commonest late-flowered aster of the Atlantic border." It has a head like an oxeye daisy, except in color, with from fifteen to twenty-four rays. The stalk grows from one to three feet tall. It prefers the swamp to dry land and clings close to the coast from Maine to Georgia. It has several varieties, including *laevigatus* and *litoreus*, the former smooth and with upper leaves clasping the stem, the latter low and stiff.

#### EASTERN SILVERY ASTER

*Aster concolor* L.

(See Page 59)

Growing in dry, sandy soil near the coast, in Massachusetts and southward, this attractive member of the aster family has a stem from two to three feet tall, unbranched below the flower, and with leaves crowded and pressed close to it.

Sir John Lubbock was of the opinion that all flowers originally were merely pistils and stamens surrounded by green leaves.

#### PEARL EVERLASTING

*Anaphalis margaritacea* (L.) Benth. & Hook.

(See Page 68)

With a range that reaches from the Atlantic to the Pacific and far into Canada, the pearl everlasting is well-possessed of local aliases, such as silver-leaf, moonshine, none-so-pretty, lady-never-fade, ladies'-tobacco, and silver-button. An adventive from Europe, it has spread until it has added even Alaska to its empire. Furthermore, it has ventured as far south as North Carolina. Dry

fields and open woods constitute the environment in which the pearl everlasting thrives best, and July to September the season in which it puts forth its flowers.

For fertilization it is entirely dependent on its insect guests. It bears male and female florets on separate heads, although on the same plant, so that it must cater to its patrons. The female florets have tubular, five-cleft corollas, two-cleft styles and a large number of hairy bristles. The male florets are more slender. The nectar of the pearl everlasting is protected from pilfering ants by a cottony substance on the wiry stem of the plant. It is next to impossible for the ants to travel through this fluffy defense.

#### BEGGAR-TICKS

*Bidens frondosa* L.

(See Page 59)

The beggar-ticks illustrated is one of a group of about 75 species of wide distribution whose seeds have hooked teeth for stealing transportation from passing creatures. The genus includes the bur-marigolds and the tickseed-sunflowers.

*Bidens frondosa* is found in moist soils from Nova Scotia to Florida and from British Columbia to California and Texas. It has also gone across the seas to help repay Europe in her own coin for weeds, having first secured foothold on the Mediterranean.

This species of beggar-ticks is variously known as the rayless marigold, cuckles, old-ladies clothespins, beggar-lice, etc. Its blossoming time is from July to October.

#### ROUGH JOE-PYE-WEED

*Eupatorium maculatum* L.

(See Page 63)

Rough joe-pye-weed, also known as spotted joe-pye-weed, has many aliases. In some places it masquerades as trumpetweed; elsewhere it travels under the name of thoroughwort, while in still other localities it passes as cottonweed.

First of all, rough joe-pye-weed asks for a moist soil. Given that, it will live either in meadow or in wood. It is a rather late comer in the flower procession, August and September being its months. As a habitat it claims all of that portion of North America between New Brunswick and Manitoba on the north to the Gulf of Mexico and the Rio Grande on the south.

It marches through the world with head held high, having long since learned that in the flower kingdom, as well as in the business world, it pays to advertise. Therefore, it erects a sort of Metropolitan Tower in flower land, decked with a beautiful and wonderful collection of magenta flags. Of course, no insect could miss it, and during its business season it has a host of visitors, to each of whom it offers a cup of nectar in return for a little service as a pollen carrier.

A clever arrangement has been worked out by the rough joe-pye-weed, whereby, if there happens to be a rainy spell and the insects are not flying when it blooms, it can fertilize its own florets, and thus protect itself against the evils of race suicide in flower land.

The plant's name is derived from Joe Pye, an Indian herb doctor of Pilgrim days in Massachusetts. It is claimed that he cured typhus fever with decoctions he made from this weed. It is also



GOLDENCLUB  
*Orontium aquaticum* L.  
 ARUM FAMILY  
 (See Page 45)



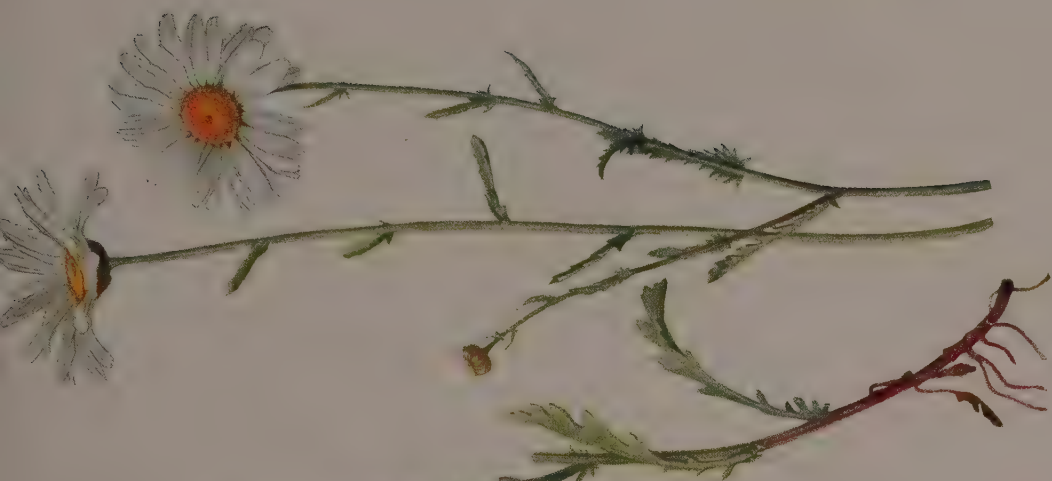
SWEETFLAG  
*Acorus calamus* L.  
 ARUM FAMILY  
 (See Page 45)



NEW YORK ASTER  
*Aster novibelgi* L.  
 ASTER FAMILY  
 (See Page 53)



SAGEBRUSH  
*Artemisia tridentata* Nutt.  
 ASTER FAMILY  
 Nevada State Flower  
 (See Page 46)



OXEYE DAISY  
*Chrysanthemum leucanthemum* L.  
 ASTER FAMILY  
 North Carolina State Flower  
 (See Page 53)



claimed that with it he set shaking bones to rest in ague-rent bodies; hence its vernacular name "spotted boneset."

### MISTFLOWER

*Eupatorium coelestinum* L.

(See Page 58)

This close relative of the joe-pye-weed, the snow thoroughwort, and the boneset, loves rich soils, in which it grows from New Jersey to Michigan, Kansas, and the Southwest. It is somewhat hairy, and, as an aster that has flowers ranging from violet to purple, it represents one of the most advanced members of the floral kingdom.

### GAYFEATHER

*Laciniaria squarrosa* (L.) Hill

(See Page 58)

The gayfeather, which possesses many other names in the vernacular, among them colic-root, rattlesnake-master, blazing star, and button-snake-root, flowers from June to September and is found as far north as Ontario, as far south as the Gulf of Mexico, and as far west as Nebraska.

The flowers at the top of the stem open first and those further down in the order of their position. All have both stamens and pistils, and cater to the long-tongued bees, flies, and moths.

The rural name of rattlesnake-master comes from the belief that the tuber at the root of the plant possesses properties that will cure the bite of a rattlesnake.

### PURPLE CONEFLOWER

*Echinacea purpurea* (L.) Moench

(See Page 58)

The purple coneflower, growing from two to five feet high, flourishes in moist, rich soil from Pennsylvania and Michigan to Georgia, Arkansas, and Louisiana. Its flowering season is from July to October. In some sections it is known as the red sunflower and elsewhere as the black Sampson.

### BIGNONIA FAMILY

*Bignoniaceae*

Consisting of some 500 species divided into some 60 genera, the bignonia family is essentially a tropical one, although a few species have found their way across Capricorn and Cancer. The species range from trees like the catalpa to shrubs and woody vines and on down to exotic herbs. Some authorities subdivide the family and set up a second one known as the unicornplant family. But the Government botanists keep these species with the bignonias. The unicornplant or elephant's trunk, which is an "escape" from cultivation that has established itself in waste places along the eastern seaboard, is a member of a closely related family, under the Government's classification. Some authorities call the family trumpetcreeper instead of bignonia.

### TRUMPETCREEPER

*Bignonia radicans* L.

Kentucky State Flower

(See Page 72)

Who that has studied the enthusiasm with which that frail and filmy creature, the ruby-throated humming-bird, flits from flower to flower of the

trumpetcreeper, burying its head and shoulders deep in the enveloping corolla as it strives to drain the last drop from the floral honey cup, or who that has observed closely the constant effort of the trumpet flower to captivate this capricious, swift-winged beauty can doubt the community of interest between them? When Audubon came to paint his plate showing the ruby-throats in life colors, he portrayed them hovering about a cluster of the trumpetcreeper's flowers.

Kentucky has made the trumpetcreeper, under the name of trumpet vine, her State flower, and few States can boast of such a brilliant member of the sisterhood of emblematic blossoms. Growing on a vine that has as much vitality as a Lexington thoroughbred and as much resourcefulness in holding its own in the gruelling free-for-all race for existence as any star of the turf, the trumpetcreeper is well beloved by those who live within the Blue Grass State and by a host who enjoy no such fortune.

Except in the West, the vine is no blatant intruder in places where it is not wanted and never drives the careful farmer distracted by a disposition to preempt land which he dedicates to grass. Rather it seeks the moist, rich wood and thicket, desiring only to have its chance to survive in this habitat without intruding upon every kind of landscape. Invited to do so by the lover of flowers, it willingly comes out of the woods and forms a delightful arbor for any porch. Sometimes, in parts of the country where it did not originally grow wild, it lives as an "escape" from the portico arbor of the well-kept home. It begins to flower in August and seeds in September. From Jersey's shores to the Mississippi's banks, from the Lakes to the Gulf, it finds hospitable soil and genial weather.

Were it human, the trumpetcreeper would not, perhaps, be loved so well. Its instincts of survival are so strong that it does not hesitate to trample upon the rights of weaker neighbors in its efforts to reach the top. Sometimes its aerial rootlets carry it upward or onward until it has stalks even 40 feet long. Ever reaching up and striving for a place with the elect of the plant world, it would be in danger of being called a "social climber"; but as a flower we can admire its determination to win its place in the unhampered room at the top.

### BELLFLOWER FAMILY

*Campanulaceae*

The bellflower family consists of about 40 genera and 1000 species and has a wide geographic distribution. It is made up of herbs in our latitudes, but some tropical species acquire the stature of shrubs and even trees. Among the members of the family might be mentioned the Arctic harebell, the famous bluebells of Scotland, the false rampion, the coventry-bells, the Danesblood, and those ever-charming friends the canterbury-bells. The lobelias are so closely related to the bellflowers that many authors give them place in the bellflower household. But both the Government botanists and Britton and Brown give the lobelias a place as a family by themselves.

### HAREBELL

*Campanula rotundifolia* L.

(See Page 71)

No flower in all Nature's garden has more of romance and interest clustering about it than the bluebell. What heart has not thrilled at the

lore and legends of the bluebells of Scotland! And yet Scotland has no monopoly of them. They are at home throughout much of the Northern Hemisphere, gladdening impartially the northern regions of Europe, Asia and America. In America they wander as far south as the Mason and Dixon Line in the East, to Arizona in the Rockies, and to California in the Sierras.

The harebell frequently is taken for a bluebell, but would be quite content to retain its own identity, and its own name. That name, some say, is a reminder that our ancestors were poor spellers. The filamental nature of the harebell's branches reminded the Scotch of hair. But they spelled it with an "e" instead of an "i" and the spelling has been accepted by botanists.

Other old English names were ladies' thimble and witch's thimble.

A dainty and delicate perennial is this modest harebell, but with enough strength to climb 5,000 feet without turning a leaf.

The flowering season is from June to September.

### VENUS LOOKINGGLASS

*Specularia perfoliata* (L.) A. DC.

(See Page 71)

This member of the bellflower family has a wand-like stem that is sometimes too weak to stand alone, and therefore it is often found leaning on surrounding vegetation for support. It blossoms from May to August and grows almost everywhere from upper Canada to middle Mexico, preferring waste places and dry woods.

The late John Burroughs thus describes this flower: "A pretty and curious little weed, sometimes found growing in the edge of the garden, is the clasping *Specularia*, a relative of the harebell and of the European Venus lookingglass. Its leaves are shell-shaped, and clasp the stalk so as to form little, shallow cups. In the bottom of each cup three buds appear that never expand into flowers but when the top of the stalk is reached, one, and sometimes two, buds open wide into a large, delicate, purple-blue corolla. All the first-born of this plant are still-born, as it were; only the latest, which spring from its summit, attain to perfect bloom."

### BUR-REED FAMILY

*Sparganiaceae*

This family is a small one with only one genus and a comparatively few species. It is made up of marsh and pond plants with creeping rootstocks and fibrous roots. Among its members are the broad-fruited bur-reed, with a range from Hudson Bay to the Gulf of Mexico; the stemless bur-reed, found from Newfoundland to South Dakota and Virginia; and the floating bur-reed, which lives on ponds and cold lakes from Maine and Connecticut to Minnesota.

### BRANCHING BUR-REED

*Sparganium angrocladum* (Engelm.) Morong

(See Page 71)

Swamps and shallow waters are the branching bur-reed's haunts, and its range reaches from Newfoundland to Minnesota and southward to Florida and Louisiana. The flowering season is from June to August.

The family, as a whole, has flowers arranged like those of the cattail family, but collected in separate spherical heads. They are largely self-

fertilizing, but aquatic insects and flies render them some assistance in their task of setting seed.

### BAYBERRY FAMILY

*Myricaceae*

The bayberry family consists of 2 genera and 35 species having a wide distribution. In addition to the two species whose biographies and paintings are here given, the waxmyrtle, and the sweetfern are familiar examples of the family. The former occurs in sandy swamps and wet woods from southern New Jersey to Florida, and westward to Arkansas and Texas, and is variously known as the candleberry, waxberry, tallow-bayberry, tallow-shrub and sweet oak. The sweetfern has a range extending from Nova Scotia and Saskatchewan southward to North Carolina and Arkansas, and is known as the Canada sweetgale, the meadow-fern, and the sweet-ferry.

### NORTHERN BAYBERRY

*Myrica carolinensis* Mill.

(See Page 70)

Known also as bay myrtle and tallow-shrub, the favorite place of abode of the northern bayberry is sandy soil, and its habitat extends from Alaska and Nova Scotia to Florida. It owes its names waxberry and tallow-shrub to the service which it rendered to the colonists in America. Animal fats were not overplentiful in those days; but the farmer had a large family of children, and he believed that they could gather berries for making candles with more edification than they could play—according to the stern Puritan views of the times.

Candles made from bayberry wax are more brittle and less greasy than those made from tallow. They are a curious, translucent green, and when the flame is put out the resulting odor is as sweet and pungent as incense.

The bark and roots of the bayberry possess medicinal properties. The roots, when boiled, yield a tea reputed to be a specific for headache; to the bark are attributed properties valuable in the treatment of jaundice and in making soothing poultices for sores and ulcers. Some people have used the leaves, which are bitter and aromatic, as a substitute for hops in the brewing of beer, it being alleged that they increase the intoxicating effect of that beverage.

### SWEETGALE

*Myrica gale* L.

(See Page 70)

Not many species have as wide a distribution, and very few a wider one than *Myrica gale*. It is found in swamps and around ponds and lakes from Newfoundland to Alaska and southward to Virginia and Washington. It also spreads across Asia and Europe. Baybush, meadow-fern, sweet willow, golden osier, and bog-myrtle are some of its American aliases. It comes into blossom in April and May, and grows from one to four and one-half feet in height.

The sweetgale is a small shrub, with leaves somewhat like those of the willow. It possesses a fragrant odor and a bitter taste and yields an essential oil by distillation. It was formerly used instead of hops in the making of beer in northern Europe. When the catkins are boiled in water they yield a scum resembling beeswax, which has been used in the making of candles. The dried leaves are also used to give a scent to linens.



MISTFLOWER  
*Eupatorium coelestinum* L.  
ASTER FAMILY  
(See Page 56)



PURPLE CONEFLOWER  
*Echinacea purpurea* (L.) Moench  
ASTER FAMILY  
(See Page 56)



GAYFEATHER  
*Laciniaria squarrosa* (L.) Hill  
ASTER FAMILY  
(See Page 56)

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BEGGAR-TICKS  
*Bidens frondosa* L.  
ASTER FAMILY  
(See Page 53)



EASTERN SILVERY ASTER  
*Aster concolor* L.  
ASTER FAMILY  
(See Page 53)



COMMON TANSY  
*Tanacetum vulgare* L.  
ASTER FAMILY  
(See Page 52)

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The word gale in use for this plant, among various north-European races, also appears in the forms gaul, gabel, and gagl.

The Highland clan, Campbell, wear the sweet-gale, the Scotch edition of the bayberry, as its family badge.

### BARBERRY FAMILY

#### *Berberidaceae*

The barberry family consists of about 10 genera and 130 species, widely distributed in the temperate lands of North and South America, with a few species venturing into the American Tropics. In addition to the species portrayed in this book, widely distributed members of the family include the twinleaf, also known as ground-squirrel pea, helmet pod, or rheumatism-root; and the mayapple, also known as wild mandrake, ground-lemon, and raccoon-berry.

The fruit of some species is used in making jellies noted for their beautiful color and distinct flavor, the yellow roots of other species in dyeing, and the bark of still other species in tanning.

### OREGON HOLLYGRAPE

#### *Berberis aquifolium Pursh*

Oregon State Flower

(See Page 69)

The Oregon hollygrape is one of the State flowers which has the prestige of legal status behind its queenship. Between its dainty blossoms of early summer and its grape like berries of late fall, it wins admiration wherever it grows. It lives close to the ground and is not a climber like the ordinary American wild grape. But no fruit of field or forest ever made a more delicious jelly than that of this handsome shrub of the West. Though the berries resemble the blueberry, the foliage looks like that of the holly, and the wood inclines to a yellowish red. Its range extends from western Oregon through the State of Washington northward into British Columbia.

It is one of the strange things about Nature that so many of its creatures are unable to perpetuate their species without a periodic change of environment. For instance, the germ of yellow fever dies and disappears where it cannot spend part of its time in the human body and part in the stomach of a *Stegomyia* mosquito. Likewise, cedar rust becomes extinct if it cannot live one year on an apple tree and the next on a cedar tree. In the case of one species of wheat rust the barberry is necessary to its continued hold on life. This rust cannot live without changing hosts periodically.

But the Oregon hollygrape is wiser than some of its immediate kinsfolk. It has a preference for situations where the communication of rust spores to it from wheat and from it to wheat is not quite so readily accomplished and thereby escapes the anathemas of the wheat grower. It is found most abundant and beautiful on the foothills and mountain slopes deep in Oregon's lumber lands.

### EUROPEAN BARBERRY

#### *Berberis vulgaris L.*

(See Page 69)

The European barberry has been naturalized from Europe in the Eastern and Middle States and from there has spread to Canada and the West. It consists of numerous races and is various-

ly known as pepperidge-bush, jaundice-berry, and wood-sour. Blossoming in May and June and bearing fruit in September, it grows from five to eight feet high. Its preferred habitat is thickets and roadsides.

Though the flowers are small, they are decidedly resourceful in insuring themselves the full service of their insect visitors in securing cross-fertilization. In one respect the arrangement of the stamens and pistil suggests that of the mountain-laurel, but the stamens are not held back by little springs like those of the laurel. Those of the latter plant catapult their pollen onto their visitors, while those of the European barberry are endowed with life and motion and are able to move like the leaflets of a sensitive plant. If the base of the filament be touched on the inside with a pin, the stamen promptly shrinks and draws in toward the pistil in much the same way as the sea anemone closes its tentacles when touched.

When a bee visits one of the new-blown flowers, it finds the six little stamens resting wide apart, against the several petals. Thrusting its tongue into the nectar gland, the bee touches several of the stamens, whose pollen chambers are open and ready to scatter their contents. As the stamens draw in they dust the head of the bee, which carries this pollen dust to the next flower it visits.

### BLUE COHOSH

#### *Caulophyllum thalictroides (L.) Michx.*

(See Page 70)

Strange in structure as in habit, shunning the roadside and the haunts of man with all of the timorous traits of a hermit thrush or the fearsome nature of a wild deer, the blue cohosh hides in the deepest recesses of thick forests. Its structural cells contain substances that have not yet yielded their secrets to the test tube of the chemist.

The habitat of this flower is extensive. It occurs throughout southern Canada and far down in Dixie. Only where the leaf mold is thick does it reside, being a rich liver. A native of America, it is variously known in the provincial tongue as pappoose-root, squaw-root, blueberry-root, yellow ginseng, etc. It is an inconspicuous herb in spring, but in the fall attracts attention by its graceful aspect and brilliant coloring. When young the whole plant is covered with bloom.

The flowering time of the blue cohosh is April and May. Its blossoms are purplish, or yellowish green, and scentless. The seed, as large as a pea, looks like a berry. When roasted the seeds make a fair substitute for coffee.

### BLADDERNUT FAMILY

#### *Staphyleaceae*

A small family, consisting of only about 22 species, the bladdernuts are widely distributed. Their wood is white and hard and is used in turning. The flower buds are often pickled like capers, and the nuts of some foreign species are eaten.

### AMERICAN BLADDERNUT

#### *Staphylea trifolia L.*

(See Page 73)

The American bladdernut lives in moist woods and thickets from Quebec and Ontario to South Carolina and Kansas.

It is a shrub that grows to a height of 15 feet and blossoms in April and May. Its greenish

white flowers, arranged in nodding panicles, give the bladdernut its generic name, since they resemble the bunch of grapes called by the Greeks *staphyle*. Its specific name arises from the grouping of its leaves. Its common name was suggested by the inflated capsule and the hard-shelled seed inside.

The European bladdernut, *S. pinnata*, is often imported by landscape gardeners and planted as an ornamental shrub.

## BIRTHWORT FAMILY

### *Aristolochiaceae*

The birthwort family consists of 6 genera and about 200 species, widely distributed over the face of the earth. It is made up of herbs and shrubs, and includes the wildgingers, the Virginia snakeroot, the Dutchmans-pipe, and the woolly pipe-vine. Few flowers are better described by their common names than the Dutchmans-pipe. If Nature were in a caricaturing mood when she shaped the flowers of this species, she did a splendid job.

## CANADA WILDGINGER

### *Asarum canadense* L.

(See Page 73)

Variously known as the Canada snakeroot, false coltsfoot, colic-root, etc., the Canada wildginger has a range that extends from New Brunswick and Manitoba to North Carolina and Kansas. Its flowering season is April and May, and its flower is a dull, solitary, purplish brown blossom on the outside and creamy white within. The plant seldom raises its head above the ground, and usually hides its flower among the dead leaves that carpet the floor of the forest.

The lowly position the flower assumes is not a matter of madness without method. Bees and butterflies sleep too late in the spring to serve it in its early adventures. But the fungus gnats and the flesh flies are early on the job, and as soon as they begin to come out of their pupal cases under dead leaves and beneath the bark of decaying trees, the wildginger's flower is close at hand, down in the débris, where there is at once a pleasing haven from cold winds and an abundant supply of pollen for food.

## BORAGE FAMILY

### *Boraginaceae*

The borage family consists of about 85 genera subdivided into some 1,500 species. Mostly herbs, there are some shrubs and a few tropical trees in this group of plants. Among its members we find the heliotropes, the houndstongue, the comfrees, the stickseeds or beggar's-lice, the lungworts, the forget-me-nots, the gromwells, the puccoons, the borages, the buglosses, and the Virginia bluebells.

## TRUE FORGET-ME-NOT

### *Myosotis scorpioides* L.

(See Page 75)

The forget-me-not is a delightful immigrant whose flowering season is from May to July. It came to us from Europe and Asia, and is now spreading from Nova Scotia southward along the Atlantic coast. It was led into captivity many centuries ago. As far back as we are able to trace floral history it held an honored place in the flower

garden, and when America was settled, it was brought along to cheer the settlers' austere life, and to remind them of the old roof-tree across the billowy sea.

The forget-me-not likes to play hookey from the flower garden, and to steal down to the brook-side and meadow and live within earshot of the gurgling stream. With all that man has done for it, he has never bred out of it the spirit of independence that has been lost by most of the other flowers of the garden, for whenever opportunity affords, the forget-me-not yields to the call of the wild.

Have you ever noticed the little golden circle around the center of the flower? That little circle is put there by the flower as a honey guide, to tell the bee just where to insert her tongue to get the richest draught of nectar, and at the same time to touch both anther and stigma and thus fertilize the plant. And if you will watch the bees, you will discover that they are as careful to follow this signboard pointing to the well of nectar as a motorist is to follow the signboard to the best hotel when night overtakes him.

There are many legends concerning the forget-me-not. Tennyson once wrote that it grows for happy lovers. Another writer tells us that once upon a time a young lover, trying to gather a bunch of these lovely blossoms for his sweetheart, slipped into the water and, as he was sinking, tossed the flowers to her and asked her to keep them and not to forget him.

## VIRGINIA BLUEBELLS

### *Mertensia virginica* (L.) DC.

(See Page 75)

When Harry Lauder sings about the lassie he loves who is as modest as her namesake, the bluebell, he accords her high praise, for the Scotch bluebell is as demure as our own, and who has not noted the simple, drooping shyness of this fair little inhabitant of the woods of eastern America!

In April and early May it comes out to cheer the waiting world, a little behind the arbutus, the crocus, and the daffodil. It loves the alluvial, low ground of the forestland and ranges from southern Canada to South Carolina and Kansas. Its flowers stay with us until late May.

No lover of the beautiful has ever failed to pay tribute to the bluebell. Its drooping porcelain-blue bells have won praise from the naturalists of the world. An English writer pays high tribute to them, saying that no flower surpasses the *Mertensias* of North America in beauty of form and foliage or in the graceful way in which they rise to panicles of blue. The fairest of them he rates the Virginia bluebell.

Not every insect that loves nectar can drink at the bluebell's bar, for "straight is the gate and narrow is the way, and long tongues go in thereat." But every insect that comes must be a pollen bearer, for the bluebell needs must have cross-fertilization.

One of the unexplained idiosyncrasies of the bumblebees occurs in conjunction with their feasts out of the bluebell's honey well. Only the female bumblebee is flying when this flower blooms, and they are able to sip far deeper cups than the bluebell can offer; but, whether from laziness or mischief or what, they may frequently be seen trying to dodge their duties as pollen bearers by perforating the cups instead of draining them in a legitimate manner.





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NEW ENGLAND ASTER  
*Aster novae-angliae* L.  
ASTER FAMILY  
(See Page 52)



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ROUGH JOE-PYE-WEED  
*Eupatorium maculatum* L.  
ASTER FAMILY  
(See Page 53)

## VIPERS-BUGLOSS

*Echium vulgare* L.

(See Page 76)

This species is a large biennial, native of Europe, growing in dry places, particularly in cornfields, where it often becomes a troublesome weed. Its range is from Nova Scotia to Ontario, and southward to North Carolina and Nebraska, where its flowering season runs through June and July. The flowers are at first pink or reddish, later changing to blue. The spots on the stems resemble somewhat those on the viper, and our forefathers concluded therefrom that it had the property of healing vipers' bites. Hence its name.

## BLADDERWORT FAMILY

*Pinguiculaeae*

Gray and Britton and Brown both call this family the *Lentibulariaceae* but the National Herbarium prefers the designation above. The average layman will find either a tongue twister and prefer to speak of this group of plants as the bladderworts, which has the unanimous approval of these three authorities. The bladderworts are either waders or dwellers in moist ground. Some of them have partially followed the example of the sundews in setting traps for insects. The leaves secrete a sticky material which makes them a sort of natural flypaper. When the tanglefoot properties have done their work, the leaf rolls up around the prisoner and secretes a juice that digests the victim. In northern countries one of the bladderworts is used instead of rennet in the curdling of milk. The family consists of about 16 genera and 300 species.

## ZIGZAG BLADDERWORT

*Utricularia macrorhiza* Le Conte

(See Page 74)

This bladderwort is found in stagnant water or sluggish streams from Newfoundland to Alaska and southward to Maryland and southern California. Its flowering season is from May to August. The bladders are found on submerged branches, and are modified leaves. Leading into each bladder is a door which opens inward but not outward. The insect that creeps in finds ingress easy and inviting, but escape impossible. The products of its decomposition are absorbed by cross-shaped cells lining the inner surface of the bladder.

## BLUEBERRY FAMILY

*Vacciniaceae*

The blueberry family is composed of shrubs which have a wide geographic distribution. It consists of about 20 genera and some 300 species. The plants of this group are so closely related to the heaths that Gray puts them in that family. Britton and Brown call the group the huckleberry family but the National Herbarium uses the name given above. The huckleberries and the cranberry are included in the family. In the markets there is a tendency to call the black berries huckleberries, and the blue ones blueberries.

## CRANBERRY

*Oxycoccus macrocarpus* (Ait.) Pursh

(See Page 73)

The cranberry is a trailing evergreen, with a slender, woody stem, growing from one to four feet

long. It is very tough, in spite of its delicate proportions, and is found in open bogs and swamps from Newfoundland to western Wisconsin, with scattered colonies as far south as the Carolinas and Arkansas. Its favorite haunts, however, are in Massachusetts, New Jersey, northern Michigan, and Wisconsin. June and July are blossom time in cranberry land, and the flowers are as pink and pretty as the berries are red and round. The former are tube-shaped and pendant from slender, swaying stems.

First domesticated about 1810, not until some four decades later did its merits become widely known and its berries find their way into the homes of the people of the nation. To-day the estimated production is around fifty million quarts a year—a pint for every human being in the United States.

## Highbush Blueberry

*Vaccinium corymbosum* L.

(See Page 74)

Who that has eaten a real blueberry roll or partaken of a piece of genuine, unadulterated, well-baked blueberry pie can doubt that Frederick V. Coville was right when he declared that the blueberry had the cranberry beaten, because "you can't use cranberries without buying a turkey to eat with them!" This eminent authority has written fascinating articles about blueberries in the NATIONAL GEOGRAPHIC MAGAZINE for February, 1911, May, 1915, and June, 1916.

## EARLY Highbush Blueberry

*Vaccinium atrococcum* (A. Gray) Heller

(See Page 74)

The early highbush blueberry has practically the same range as its cousin, *V. corymbosum*. It flourishes from Maine and Ontario to North Carolina and westward. The shrub has shreddy bark and its green branches are covered with minute warty excrescences. The young twigs are downy, as are also the under surfaces of the leaves. The foliage does not develop until after flowering time. The blossoms are yellowish or greenish white, tinged with red; they are small and appear about ten days earlier than those of *V. corymbosum*. The fruit likewise ripens earlier. The berries are black and shine like beads, but are without the waxy bloom that serves as a natural mackintosh for so many plants.

## Bunchflower Family

*Melanthiaceae*

The bunchflowers are usually leafy-stemmed herbs with rootstocks or occasionally with bulbs. They embrace about 40 genera and 145 species, widely distributed. They include, among others, the false asphodel, the trianthas, the tofieldias, the bog asphodel, the turkeybeard, the swamp-pink, the fairywand, the fly poison, the featherfleeces, the camases, and the false-hellebores.

## DEVILSBIT

*Chamaelirium obovale* Small

(See Page 77)

This flower is found in moist meadows from southern Canada to Florida and Arkansas, and sometimes travels under such names as blazing-





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BLACK-EYED-SUSAN  
*Rudbeckia hirta* L.  
ASTER FAMILY  
Maryland State Flower  
(See Page 48)



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COMMON SUNFLOWER  
*Helianthus annuus* L.  
ASTER FAMILY  
Kansas State Flower  
(See Page 49)



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OLDFIELD GOLDENROD  
*Solidago nemoralis* Ait.  
ASTER FAMILY  
Nebraska and Alabama State Flower  
(See Page 48)





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COMMON YARROW  
*Achillea millefolium* L.  
 ASTER FAMILY  
 (See Page 52)



PEARL EVERLASTING  
*Anaphalis margaritacea* (L.) Benth. & Hook.  
 ASTER FAMILY  
 (See Page 53)



EUROPEAN BARBERRY  
*Berberis vulgaris* L.  
 BARBERRY FAMILY  
 (See Page 60)



OREGON HOLLYGRAPE  
*Berberis aquifolium* Pursh  
 BARBERRY FAMILY  
 Oregon State Flower  
 (See Page 60)



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**BLUE COHOSH**  
*Caulophyllum thalictroides* (L.) Michx.  
 BARBERRY FAMILY  
 (See Page 60)



**NORTHERN BAYBERRY**  
*Myrica carolinensis* Mill.  
 BAYBERRY FAMILY  
 (See Page 57)



**SWEETGALE**  
*Myrica gale* L.  
 BAYBERRY FAMILY  
 (See Page 57)





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**BRANCHING BUR-REED**  
*Sparganium angustifolium* (Engelm.) Morong  
 BUR-REED FAMILY  
 (See Page 57)

**VENUS LOOKINGGLASS**  
*Specularia perfoliata* (L.) A. DC.  
 BELLFLOWER FAMILY  
 (See Page 57)

**HAREBELL**  
*Campanula rotundifolia* L.  
 BELLFLOWER FAMILY  
 (See Page 56)



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TRUMPETCREEPER  
*Bignonia radicans* L.  
BIGNONIA FAMILY  
Kentucky State Flower  
(See Page 56)



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AMERICAN BLADDERNUT (Upper left)

*Staphylea trifolia* L.  
BLADDERNUT FAMILY  
(See Page 60)

CANADA WILDGINGER (Upper right)

*Asarum canadense* L.  
BIRTHWORT FAMILY  
(See Page 61)

CRANBERRY (Lower)

*Oxycoccus macrocarpus* (Ait.) Pursh  
BLUEBERRY FAMILY  
(See Page 64)





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HIGHBUSH BLUEBERRY (Upper left)  
*Vaccinium corymbosum* L.  
 BLUEBERRY FAMILY  
 (See Page 64)

EARLY HIGHBUSH BLUEBERRY (Upper right)  
*Vaccinium atrococcum* (A. Gray) Heller  
 BLUEBERRY FAMILY  
 (See Page 64)

ZIGZAG BLADDERWORT (Lower)  
*Utricularia macrorhiza* Le Conte  
 BLADDERWORT FAMILY  
 (See Page 64)



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TRUE FORGET-ME-NOT  
*Myosotis scorpioides* L.  
BORAGE FAMILY  
(See Page 61)

VIRGINIA BLUEBELLS  
*Mertensia virginica* (L.) DC.  
BORAGE FAMILY  
(See Page 61)



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VIPERS-BUGLOSS  
*Echium vulgare* L.  
BORAGE FAMILY  
(See Page 64)



BEECHDROPS  
*Leptamnium virginianum* (L.) Raf.  
BROOM-RAPE FAMILY  
(See Page 81)





GLOSSY BUCKTHORN  
*Rhamnus frangula* L.  
 BUCKTHORN FAMILY  
 (See Page 81)



DEVILSBIT  
*Chamaelirium obovale* Small  
 BUNCHFLOWER FAMILY  
 (See Page 64)



GIANT CACTUS  
*Carnegiea gigantea* (Engelm.) Britton & Rose  
 CACTUS FAMILY  
 Arizona State Flower  
 (See Page 84)



CACTUS  
*Echinocereus fendleri* (Engelm.) Ruempl.  
 CACTUS FAMILY  
 New Mexico State Flower  
 (See Page 84)



CURLY DOCK  
*Rumex crispus* L.  
BUCKWHEAT FAMILY  
(See Page 81)



SHEEP SORREL  
*Rumex acetosella* L.  
BUCKWHEAT FAMILY  
(See Page 81)



ARROWLEAF TEAR-THUMB  
*Tracaulon sagittatum* (L.) Small  
BUCKWHEAT FAMILY  
(See Page 81)

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SPIDERFLOWER  
*Cleome spinosa* L.  
 CAPER FAMILY  
 (See Page 84)



COMMON SWEETSHRUB  
*Calycanthus floridus* L.  
 CALYCANTHUS FAMILY  
 (See Page 88)

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star, unicorn-root, unicorn-horn, drooping starwort and false unicorn-plant. It flowers in May, June and July.

### BUCKWHEAT FAMILY

#### *Polygonaceae*

In this family, of which the sheep sorrel and the smartweed are familiar members, we find the several species running the gamut of form—with herbs, vines, shrubs and trees all included. There are some 40 genera and more than 800 species in this group of plants. The eriogonums, the docks, the sheep sorrel, the knotweeds, the persicarias, the ladys-thumb, the tear-thumbs and the jointweeds belong to the family. The English name buckwheat is derived from an old German word for beechwheat, because the seeds resemble tiny beechnuts.

### CURLY DOCK

#### *Rumex crispus* L.

(See Page 79)

Like so many other plants that have the cuckoo habit of making others do their work, the curly dock is an undesirable alien stowaway from Europe. It fraternizes with the farmer's crops, and therefore succeeds in forcing him to prepare its bed and scatter its colonies, and has spread well around the world in the North Temperate Zone, invading every region where major cereals are cultivated. It grows from one to three and one-half feet high, has a flowering season from June to August, and replaces its wavy-margined leaves with heart-shaped seed wings. It has been shown to hybridize readily with another species, the bitter dock, *R. obtusifolius*.

### SHEEP SORREL

#### *Rumex acetosella* L.

(See Page 79)

The sheep sorrel is another of the plant world immigrants to America that deserves deportation as an undesirable alien; but, like the English sparrows of the feathery kingdom, it fights its way into every community by its fecundity. Rivers, mountains, quarantines—every barrier that Nature or man has set up against it—has been overridden. Even the Rockies, which have stood as a wall of adamant against the serried hosts of most westward-bound floral invasions, have been too low to keep the sheep sorrel in check, so that it is found from ocean to ocean and from Canada to Mexico.

The plant by some is known as field sorrel and by others as sour-grass. It invades hay and pasture fields and crowds out the valuable grasses. Likewise, it disputes with the new-sown winter wheat for control of ground on which it has secured a foothold. Only the most persistent harrowing of the ground before seeding time will hold it in check until the wheat can come up and grow strong enough for the fray with the hardy foe.

Sheep sorrel grows from 6 to 12 inches tall and when mature gives the field which it has colonized a real sorrel-top appearance.

### ARROWLEAF TEAR-THUMB

#### *Tracaulon sagittatum* (L.) Small

(See Page 79)

This species lives in wet soil from Newfoundland to Florida and westward to British Columbia and Kansas. Its flowering season is from July to

September. It is a climber, sprawling over other plants to find its place in the sun. Its prickles are rather more savage than those of halberdleaf tear-thumb, of the same range. One who has had experience with these prickles feels that there was more truth than poetry in the mind of the man who gave it the English name it bears.

### BUCKTHORN FAMILY

#### *Rhamnaceae*

This family consists of a group of erect or climbing shrubs, or small trees, some of them possessing thorns. It consists of some 50 genera and 600 species occurring widely in temperate and warm regions. Included in it is the supplejack or rattan-vine, the several buckthorns and the Jersey-teas. The European and Asia Minor species known as Christ-thorn is a member of the family and got its name from the legend that the crown of thorns the Master was forced to wear was made from this shrub. Its fruit resembles a head surmounted by a broad-brimmed hat. It is related to the jujube.

### GLOSSY BUCKTHORN

#### *Rhamnus frangula* L.

(See Page 77)

The glossy buckthorn, found in bogs in sections of the North Atlantic Coast States, and sometimes known as the black dogwood, has been naturalized from Europe. It is also known in some localities as berry-alder and Persian-berry. The shrub bears its flowers in May and June and its fruit ahead of the frost.

### BROOM-RAPE FAMILY

#### *Orobanchaceae*

This family has about 11 genera and 200 species, widely distributed though most abundant in the Northern Hemisphere. It is made up of erect root parasites, whose colors are usually a mixture of brown, purple, yellow and white. Through their parasitic habits the members of the family have lost their leaves and the right to wear green, and must content themselves with scales where once they possessed leaves. Among the typical species of the family are the beechdrops, the ghost-pipes, the squaw-roots and the broom-rapes.

### BEECHDROPS

#### *Leptamnium virginianum* (L.) Raf.

(See Page 76)

Beechdrops grow from six inches to two feet high and are found in beech woods from Nova Scotia to Florida and from Ontario to Louisiana. They are sometimes called cancer-root, cancer-drops or Virginia brown-rape. They are parasitic plants with the common characteristics of the broom-rape family. The plant preys mainly on the roots of the beeches, another instance of striking specialization. It flowers from August to October.

### CACTUS FAMILY

#### *Cactaceae*

The members of the cactus family are all natives of America except some species of the epiphytic genus *Rhipsalis* in tropical Africa and Asia, epiphytic plants being those that live on other plants but not as parasites. The family consists of about 40 genera and approximately 1,000 species.



POISON-IVY  
*Toxicodendron radicans* (L.) Ktze.  
CASHW FAMILY  
(See Page 85)

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SMOOTH SUMAC  
*Rhus glabra* L.  
 CASHEW FAMILY  
 (See Page 85)



POISON SUMAC  
*Toxicodendron vernix* (L.) Ktze.  
 CASHEW FAMILY  
 (See Page 88)



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The economic uses of the cacti are many, especially among primitive peoples. Some yield alkaloids used in medicine. Others produce food for man and beast—the pitahayas of Spanish America being typical fruits. On the Texas frontier grows a species producing what the English-speaking people along the Rio Grande know as Mexican strawberries. The pricklypear is another type of cactus fruit. The pricklypears, on account of their large water content, are often denuded of their thorns and fed to cattle when dry spells come. The juices of many species have served travelers in the arid regions instead of water, when the supply of H<sub>2</sub>O was short.

### CACTUS

*Echinocereus fendleri* (Engelm.) Ruempl.

New Mexico State Flower

(See Page 78)

In choosing the cactus as New Mexico's flower favorite the school children of that State honored a family of plants which are almost exclusively Americans.

The *Echinocereus fendleri* is but one of many of the types of cactus to be found on New Mexico's broad mesas and desert valleys. Looking like a cross between a pineapple, a cucumber, and a green pepper, and crowned with a brilliant flower whose red petals, yellowish stamens, and green pistil make a color symphony, this species is always a favorite. It is a sort of vegetable porcupine, ready to give every comer a reception that will not soon be forgotten. Many an admirer, seeing it for the first time, has plucked a blossom to his sorrow, for the tiny hairy thorns stick to the fingers in a most irritating fashion.

### GIANT CACTUS

*Carnegiea gigantea* (Engelm.) Britton & Rose

Arizona State Flower

(See Page 78)

When the legislature of Arizona selected the giant cactus, known to laymen as the sahuaro, as the State flower, it chose a representative whose tenacity and ability to live under stressful conditions is unsurpassed. The giant cactus sometimes grows to resemble an upstanding Brobdingnagian cucumber and at others to look like a huge green candelabra. It thrives on the mountain slopes where other plants cannot survive the shortage of moisture, rearing its thick, cylindrical branches straight up into the air as high as 40 feet. These are armed with rows of spines arranged in star shapes, and in May and June bear exquisite whitish, wax-like flowers, perfect in form and opening in the daytime.

We always think it wise to save for a "rainy" day; but paradoxical as it may sound, the "rainy" day of the cactus is the season when no rain falls. So it has arranged its household economy for "making hay" while the rain falls. In wet weather it converts itself into a sort of green-hued sponge drinking up great stores of water. It long ago suppressed the last vestige of a leaf, and in lieu thereof has covered itself with a thick, hard, impervious coating which sometimes has a grayish bloom on the surface. In other species the coating is covered by a mass of thick hairs. In this way it is able to prevent evaporation of its moisture under the fiercest sun and calmly to await new

supplies. It is indeed the vegetable counterpart of the camel.

We think of the cacti as unfriendly, yet the birds often find them a refuge. Woodpeckers make holes in the giant cactus for their nesting places. Other small birds of the arid regions move in when the woodpeckers move out. One of these is a small owl, said to be the tiniest of all members of the owl tribe. Another feathered friend of the cacti is the cactus wren, a little songster with a grayish brown back, a darker head, a spotted breast, and a white line over the eye. It builds a large, flask-shaped nest of grasses and twigs which it lines with feathers. The nest is entered by a covered way or neck several inches long.

The giant cactus, like most of its relatives, is a prolific producer of seeds. Millions reach the ground, thousands may germinate, but only now and then does one escape the perils of childhood and become a full-grown cactus. In its youthful days the giant cactus is an odd, round plant only a few inches high and with the spines, which protect it from animal depredations, undeveloped. The fruits of this species have a crimson flesh and black seeds, reminding one in those respects of the Georgia watermelon. The Papago Indians eat both the meat and the seeds.

### CAPER FAMILY

*Capparidaceae*

This family consists of about 35 genera and some 450 species, mainly inhabiting warm regions. Mostly herbs and shrubs, a few species attain to the dignity of trees. It includes the cleomes, the cleomellas, the cristatella, the clammy-weed and the spiderflower. The capers we eat as a relish are the pickled flower buds of a shrub that grows in the Levant.

### SPIDERFLOWER

*Cleome spinosa* L.

(See Page 80)

The spiderflower, sometimes passing under the name of prickly cleome, is an immigrant from the Tropics, brought here to grace our gardens. After escaping from human pampering to the open spaces, it established an independent existence there. It has been able to brave the frosts as far north as southern New York and Illinois, and prefers waste places for its habitat.

### CATTAIL FAMILY

*Typhaceae*

The cattail family consists of about 10 species grouped in a single genus. It is distributed throughout most of the warm and temperate regions of the earth. Aquatic or marsh herbs, the cattails have creeping rootstocks, fibrous roots and erect stems. The main stem branches through the mud and sends up new leafy stems every spring. Finally it decays, and all the new stems it has sent up become independent plants, in their turn to send up their own group of shoots. In this way a single plant may populate an extensive marsh in a comparatively few years. The leaves all point upward to prevent shading, and are covered with a waxy bloom to prevent the adhesion of water and the clogging of the stomata or pores.

## COMMON CATTAIL

*Typha latifolia* L.

(See Page 86)

Almost everyone is familiar with this cosmopolite of plantdom that has found America so much to its liking. It prefers the damp, moist richness of the swamp and goes wherever marshy conditions prevail, except in the high latitudes. The name tells two parts of its story—*typha*, meaning a bog, and *latifolia*, meaning broad-leaved. It grows from four to eight feet high.

Like all widely distributed plants, it rejoices in a large number of aliases, such as great-reed-mace, cat-o'-nine-tails, marsh beetle, marsh pestle, cattail flag, bull-segg, water-torch, and candle-wick.

The old Italian masters frequently painted the cattail in the hand of the Master, as a mock scepter, in their pictures of the crowning of the Christ with thorns.

## CASHEW FAMILY

*Anacardiaceae*

Also known as the sumac family, this group of plants embraces about 60 genera and some 500 species. Most of them are shrubs though many become trees. They have an acrid sap, resinous in some and milky in others. Not a few yield a poisonous principle of highly irritating qualities. The name is a corruption of *acajou*, the French form of the native Brazilian name, *acajaiba*. Many species produce tannins, resins, lacquers and varnishes. The American representatives of the family include the poison-ivy, the several sumacs, and the smoketree.

## POISON-IVY

*Toxicodendron radicans* (L.) Ktze.

(See Page 82)

The poison-ivy's range reaches as far north as Nova Scotia, as far south as Florida and Texas, and as far west as Utah and British Columbia.

As stated in the sketch of the Virginia creeper, it is often confused with that beautiful member of the clinging vine clan. The Virginia creeper is condemned as being poison-ivy oftener than poison-ivy is accredited with being a Virginia creeper. Many a Virginia creeper has reached the untimely end of mattock execution by the error, and not a few people have received a painful reminder of their mistake when they have failed to observe that three leaves spell "foe" in the ivy vine and five leaves "friend."

The poison-ivy, or poison oak, as some call it, is a prodigal climber, inclined to run over everything in sight. Even the oak sometimes is almost smothered when the poison-ivy reaches its topmost branches and spreads its dense foliage over them.

It begins to blossom in May and June, its flowers being small, fragrant, yellowish green, and arranged in densely clustered spikes. Toward fall these develop into smooth, white, wax-like berries that often hold fast the winter through. The three leaves are shining green, short-stemmed, and oval-pointed.

The poison of this ivy is a powerful, nonvolatile oil which penetrates the pores of the human skin and develops hosts of tiny itching blisters, followed by a burning swelling of the affected parts.

While we very naturally dislike a plant that poisons us when we touch it, yet if we investi-

gate the reason for its poison we discover that a vast number of plants develop poisons and near-poisons, and when we look over the list we find that we would be rather badly off without them. It is true that most of them are poisonous only when eaten, and that few are poisonous to the touch, but they have all developed these qualities in self-defense.

Some of them store their poison in their seeds, others in their rootstocks, and others in their roots to protect their progeny from harm. They do not go about looking for trouble or seeking, like the devil, whom they may destroy; but they are prepared to resist invasion of the rights of their children. Nux vomica and aconite are two of many such illustrations that might be cited.

Others develop other alkaloids, like nicotine in tobacco, the quinine of the cinchona tree, and the theine of tea, to protect themselves. Strychnine, digitalis, and a hundred and one indispensable drugs that are poisonous in overdoses are the gift of the plant world to man as a by-product of plant preparations for self-defense.

And so, when the poison-ivy learned to give off its poison by contact rather than through its own destruction, it simply went a step further than its neighbors. It has arranged its plans of defense so that it can wage war without first being eaten. In that respect it meets the problem in the same way as the thistle and the thorn, although it fights by subtle stealth rather than open warfare.

## SMOOTH SUMAC

*Rhus glabra* L.

(See Page 83)

Some authorities claim that the smooth sumac has a geographic range wider than that of any other tree or shrub. Of all the sections of the United States, the California floral region alone seems closed to it.

Environment works such changes in it, however, that a description which would fit in one section would not necessarily apply elsewhere.

The smooth sumac often grows 10 feet high, usually in colonies, seldom singly. Frequently confounded with the larger staghorn sumac and sometimes called the vinegar-tree, it thrives in almost any kind of soil and multiplies by stems that travel—like Hamlet's ghost—underground. One of the most inoffensive of plants, so many people have had such sorrowful experiences at the hands of its cousin, the poison sumac, that the innocent *R. glabra* has suffered from the evil reputation of the wicked *Toxicodendron vernix*.

In early summer the sumac is a symphony of greens. Its large, fern-shaped leaves suggest some rank, tropical growth, and dense panicles of greenish white flowers thrust themselves above the foliage. Long before the other trees and shrubs of forest and field begin to dress up for the final color carnival of the year, the sumac attires itself for the splendid pageant. Deep in the shady recess of some jungle of brier or fern, suddenly a blood-red dagger appears—one solitary leaflet, perhaps—but suggestive of the glory that is to be. Soon entire leaves are stained with the scarlet dye that Jack Frost concocts in the leaf laboratory, and before long Nature, impatient at the slower process, upsets her paint pot, leaving streaks and splashes over wood and dale and field.

The berries cluster on large, rigid stems, making them veritable torches of cardinal-colored fruit.





COMMON CATTAIL  
*Typha latifolia* L.  
CATTAIL FAMILY  
(See Page 85)



RATTLESNAKE-ROOT  
*Prenanthes alba* L.  
CHICORY FAMILY  
(See Page 89)



DANDELION  
*Leontodon taraxacum* L.  
CHICORY FAMILY  
(See Page 88)



ORANGE HAWKWEED  
*Hieracium aurantiacum* L.  
CHICORY FAMILY  
(See Page 89)

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They have a sour, astringent taste, and are said to make a cooling drink when infused in water. Such an infusion yields a black dye particularly adapted to the coloring of wool. The leaves are rich in tannic acid, and are sometimes used as a substitute for oak bark in tanning leather. The bark is used often as a mordant for red dyes—a mordant being a preparation that will cause a fiber to absorb and hold fast a given color.

### POISON SUMAC

*Toxicodendron vernix* (L.) Ktze.

(See Page 83)

All authorities agree that, not even excepting the poison-ivy, this species is the most poisonous of the cashew clan. It is found in swamps from Maine and southern Ontario southward to the Gulf of Mexico and as far west as Minnesota and Missouri. It blossoms in June and bears its fruit in the late summer. The wood of the poison sumac weighs 27 pounds to the cubic foot and is of a soft texture, yellowish brown in color.

### CALYCANTHUS FAMILY

*Calycanthaceae*

This is a very small family of only two genera and six known species, natives of North America and eastern Asia. The several species are distinguished by their aromatic bark and some by particularly fragrant flowers. The seeds develop in a pod that resembles a gall, and when they are planted and sprout they send forth two leaves that look for all the world like a green butterfly resting with outstretched wings on the ground. The shoot grows up between the wing-like leaves, which do not disappear for some weeks.

### COMMON SWEETSHRUB

*Calycanthus floridus* L.

(See Page 80)

This delightfully fragrant shrub grows from four to eight feet high. In the North it is principally a cultivated garden plant, but in Virginia and the Carolinas and westward it grows wild in rich, dry soils. It flowers from April to September, usually reaching the height of its season about wheat harvest.

While best known as sweetshrub, it sometimes is called strawberry shrub or Carolina allspice.

### CHICORY FAMILY

*Chicoriaceae*

This family consists of about 70 genera and 1500 species, widely distributed. Some authorities do not give it a family status, but make it a tribe of the aster or composite family. Except in the case of two Pacific Island genera, in which some tree species occur, the chicories are herbs that almost always contain milky, acid or bitter juices. Included in the family are the succories, the cats-ear, the hawk-weeds, the hawkbits, the lettuces, the sow-thistles and the hawksbeards.

### DANDELION

*Leontodon taraxacum* L.

(See Page 87)

Our common dandelion gets its name by the corruption of a French phrase *dent de lion*, applied

to it by the Gallic imagination that was able to see, somewhere in its shape, a lion's tooth. It is found in fields and waste places in nearly every civilized country, reaching America from Europe only a little later than the first colonists. It yields a milky juice, which in the form of an extract has diuretic and alterative properties.

Its precocious springtime habits, its excellence as greens with a tonic effect, the fun the children have with its stems and puffball heads, tend to excuse it for its intrusion in our lawns, and make it one of the most universally known of all plants.

### CHICORY

*Cichorium intybus* L.

(See Page 90)

Chicory, otherwise known as blue sailor or bunk, is another alien which came to our shores "riding the bumpers," so to speak. In the olden times, when ships carried earthen ballast, many a European weed got free transportation to America. It now flowers in Canada and the eastern United States as far south as the Carolinas; and in recent years it has pushed its empire westward, until it includes Nebraska in its American dominions.

It is a plant that loves to dwell around the haunts of men, and never wanders very far away from them; hence the roadside and the fallow field are its favorite dwelling places. It begins to flower in July, and is one of the last to pass of that myriad throng which comes while springtime snow banks still linger, and goes only when the biting frosts of autumn come to stay.

Chicory has long been one of the wild flowers of immediate and important use to man. The Belgians, for instance, even in the years before the World War, their incomes being too slender to justify the drinking of coffee, resorted to the chicory as a substitute; and in the days before our own pure food laws were enacted it became such a generally used adulterant that even the adulterant came to be adulterated.

Many a pound of what purported to be roasted chicory was perhaps half chicory and half roasted wheat or barley. In a single year we have imported nearly 7,000,000 pounds of chicory root. Even under the conditions prevailing just before the outbreak of the World War we were importing about 2,250,000 pounds annually. Some people think that chicory added to coffee imparts a flavor which makes it better than coffee in its pure state.

In Europe chicory itself is very widely used as a pot herb. The French force it and blanch it, much after our way of forcing and blanching celery, and make of it a salad which they call *harb  de capucin*.

Homer used chicory root as a part of his frugal fare, and Pliny tells us that it was one of the staple dishes of the Egyptians.

Somebody has said that the chicory is a peasant posy, which, opening its eyes on a cloudy day, sets its pale blue flowers abloom, one after the other, as sparingly as the lights are kindled in the candelabras of decaying palaces. To insure its reproduction, it never allows all of its flowers to come into bloom at once. By having them bloom in installments, it is sure at one time or another to have insect visitors that will fulfill its plans.

It is very methodical in its ways, keeping regular hours and being one of the leading exponents of the idea of "early to bed and early to rise." It generally awakens by 5 o'clock in the morning



and shuts its eyes again at 10 a. m.; but during that time it has entertained some of the most delightful insect visitors that are to be found in any community. So regular is the chicory in its habits that the Swedish naturalist, Linnaeus, used it as one of the flowers of his floral clock.

### RATTLESNAKE-ROOT

*Prenanthes alba* L.

(See Page 86)

This species occurs in Canada and the northern part of the United States as far west as the Rocky Mountains. Joy-leaf, cancer-weed, lion's-foot and wild lettuce are some of its local names. Its flowering season occurs in August and September. Rich woods, thickets and heavily shaded ground generally are its favorite haunts.

### ORANGE HAWKWEED

*Hieracium aurantiacum* L.

(See Page 87)

The orange hawkweed is an immigrant from Europe which has established itself over a range reaching from New Brunswick to Ontario and southward to Pennsylvania. It is variously known locally as the tawny hawkweed, the golden mouse-ear hawkweed, grim-the-collier, Flora's-paint-brush, and red daisy. Its flowering season begins with June and ends with September.

### CROWFOOT FAMILY

*Ranunculaceae*

The crowfoot family consists of annual or perennial herbs and a few climbing shrubs with acrid sap. It has about 35 genera and 1,100 species, distributed throughout the world, but most abundant in the Tropics. Among the familiar species are the goldenseal, the marshmarigolds, the globeflower, the hellebores, the goldthread, the baneberry, the bugbanes, the columbines, the larkspurs, the monkshoods, the anemones, the hepaticas or liverworts, the pasqueflowers, the spearworts, the buttercups, the meadowrues, the virgins-bowers, the leatherflowers, the crowfoots, and the pheasanteye. The members of the family vary much in appearance and the flowers often assume eccentric forms; some have spurs or hoods, some substitute colored sepals for petals. The family contributes a large number of handsome and popular flowers to our gardens.

### SWAMP BUTTERCUP

*Ranunculus septentrionalis* Poir.

(See Page 94)

The swamp or marsh buttercup flowers from April to July. Its range is from Georgia and Kentucky northward, and it seldom is found outside of the confines of swamps and low, wet ground. Its flowers are a deep yellow and fully an inch broad. The stem is hollow and generally smooth, though in some instances it has developed fine hairs. This buttercup is quite variable in both size and foliage. It depends mainly upon bee-like flies and very small bees for fertilization. Many of the buttercups are naturalized flower citizens of North America, having come in from Europe as immigrants many years ago. The swamp buttercup preserves itself from inbreeding by putting out only a few blossoms at a time, thus making more or less certain its cross-fertilization.

It is not to be mistaken for the common meadow buttercup, which has first place among the members of the family in distribution and hardiness. The stem of the latter is nearly always erect and propagation depends entirely upon seeds, while the subject of this sketch has longer petals and sometimes spreads by developing runners. The meadow buttercup has such an acrid flavor and such caustic propensities that cattle will not eat it. It is said that its juice is capable of raising blisters, and that beggars use it to produce sores upon their skins.

It was alleged by Pliny that the buttercup stirs him who eats into such a gale of laughter that he scarce can contain himself. He further states that unless the eater washes it down with pineapple kernels and pepper dissolved in date wine, he may guffaw his way into the next world in a most unseemly manner.

According to historical authorities, one species of buttercup was used by the ancients to poison their arrows, while the double crowfoot, or St. Anthony, would cure the plague if rubbed on the spot most affected, and was good for lunacy if applied to the neck in the wane of the moon, when that luminary was in the sign of the bull or the scorpion.

### COLORADO COLUMBINE

*Aquilegia caerulea* James

Colorado State Flower

(See Page 95)

The school children and the legislature of Colorado do not agree upon the issue of a State flower. Both have voted the honor to the columbine, but the legislature 26 years ago awarded the wreath of fame to the white-and-lavender, while 13 years ago the school children chose the blue-and-white. An outsider may declare his neutrality and his admiration for both.

It is reputed that in no other region does the columbine grow more beautiful or as large as in Colorado. The people of the Centennial State have no hesitancy in declaring that their flower is four times as large as the "Down East" species.

A native of the lower mountain regions, blooming from April to July and ranging from Montana to Mexico, the columbine cheers every pathway that leads up toward the realm of summer snows.

The name columbine comes from the Latin for dove, and was applied because the flower has a fancied resemblance to a group of dainty little doves. Its other name, *Aquilegia*, was given it because the spurs of the flower possess a resemblance—somewhat indistinct in the Colorado blossom—to the talons of the eagle. Thus the columbine may with equal claim play the role of dove of peace or eagle of war.

The various species of columbine have a wide range. The flower possesses all Europe and occupies that part of Asia between northern Siberia and the Himalayas.

In the northern half of the world there are about 50 varieties of columbine, of which some 20 occur in North America.

### AMERICAN COLUMBINE

*Aquilegia canadensis* L.

(See Page 91)

Among all the flowers that bloom, none outshine the American columbine for wild grace, untrammelled and unconventional beauty, or idyllic nature of habitat.



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CHICORY  
*Cichorium intybus* L.  
CHICORY FAMILY  
(See Page 88)



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AMERICAN COLUMBINE  
*Aquilegia canadensis* L.  
CROWFOOT FAMILY  
(See Page 89)



Choosing the stony ground of the inner woodlands for its favorite abiding place, enjoying a long flowering season covering the April-July period, and cosmopolitan enough to be at home from Nova Scotia to the Northwest Territory and from Florida to the Rocky Mountains, it is one of the most pleasant of our summer visitors.

This striking flower is a child of America; it is said that during the reign of Charles I a young colonist kinsman of the king's gardener sent to him from Virginia specimens of the plant for the adornment of the gardens of Hampton Court.

Like most flowers, the American columbine has made remarkable provision for its own propagation. It hides its nectar far back in its little cornucopias, where only those insects who are able to carry its pollen to some other flower can partake of its sweets and so the nectar is largely reserved for the big bumblebee and the little hummingbird. The former with his long tongue and strong legs can hang upside down as gaily as an acrobat on a trapeze and drink its nectar while doing so. And the ruby-throated hummingbird finds the inverted position of the honeycup no disadvantage.

The efforts of the flowers of the field to dress in the colors that delight the senses of the creatures that bear their pollen is strikingly shown in the American columbine. In Europe the hummingbird is a stranger, and the plant wears colors varying from red to blue, for the bee is its pollenizing agent there, and, as Sir John Lubbock proved by a striking series of experiments, the favorite color of the bee is blue. On the other hand, in America, where the hummingbird is the principal fertilizing agent, the American columbine attires itself in a dainty red that is known to delight "king ruby-throat."

Some of the smaller bees have learned of the discrimination that this plant practices against them through its length and narrowness of neck, and frequently they may be seen ripping holes in the tips of the petals and getting the nectar without paying their toll of pollen-carrying to the flower. As a defensive measure against this rape of her sweets, the American columbine secretes a bitter juice that often foils the invaders.

#### AMERICAN PASQUEFLOWER

*Pulsatilla ludoviciana* (Nutt.) Heller

South Dakota State Flower

(See Page 95)

Inhabiting dry soil and prairie lands, blossoming through March and April, and ranging from Illinois to the Rocky Mountains and from Canada to Texas, the American pasqueflower, elected queen of flowerland by the legislature of South Dakota, need never fear to stand in any flower company, however distinguished, however beautiful, however charming.

With the first warm sunshine of spring this spirited pasqueflower begins to lend its soft purplish hues to the landscape. Its leaves are so furry, the result of its unconscious efforts to protect itself from pilfering ants and other creeping insects, that the children of South Dakota have come to call it the gosling plant. If its lovely flowers gladden the hills while ungenial winter wanes, its fruiting period also has beauty to offer. A head of silky seedlets with their dainty plumes leads many people to call it the ground clematis, while in many quarters it still passes as an anemone.

The stalks of anemones lengthen considerably after the plants flower. Those familiar with the garden varieties have noticed how the stalks grow longer even after they have been cut. If the stems be put in water, they readily double their length. This power of cell-making, with only air, light, and water out of which to manufacture tissue, seems a wonderful gift. Devoid of roots and possessed only of local energy, it is hard to understand how the stalk continues to grow. It has been suggested that the duty of raising the seed capsule to the required height may be one that the roots have delegated to another part, just as the brain of man has delegated to the nerve ganglions the duty of shutting the eyes when they are threatened, or of causing the body to jump at a sudden noise.

The pasqueflower of South Dakota is a speaking likeness of an English variety, if indeed it is not the direct descendant of that flower. There is a tradition that the plant first arose out of the blood of the Danes who were killed on the field of battle in the stormy days of Britain's early history, and many people call it the Danesblood. Opinions differ as to how it came by its name of pasqueflower. Some say that before the Gregorian revision of the calendar it was the most abundant flower at Eastertide—hence its name. Others declare that a dye for coloring Easter eggs was obtained from it. Be that as it may, the pasqueflower itself brings delight to the prairies even before the last winter winds have roared their farewell.

#### DIAPENSIA FAMILY

*Diapensiaceae*

This family consists of six genera and about eight species, natives of the Northern Hemisphere. Most of the species are low, tufted shrubs, though some of them are perennial herbs. Those of the genus *Pyxidanthera* are trailing shrubs.

#### PYXIE

*Pyxidanthera barbulata* Michx.

(See Page 95)

In some sections putting forth its flowers even ahead of the trailing-arbutus, the pyxie is always an early harbinger of spring. The habitat of this plant is generally sandy pine woods, and its range is from New Jersey southward. The genus name comes from two Greek words, the one meaning small box, and the other, anther, and tells us that the anthers of the pyxie are little boxes with lid-like openings.

#### DOGBANE FAMILY

*Apocynaceae*

The dogbane family has a wide distribution but is chiefly tropical. Its members, of which there are about 1,100 species grouped in approximately 120 genera, take the form of perennial herbs, vines, shrubs and tropical trees. The Greek name is based on the superstition that the plants of this family are poisonous to dogs. The amsonias, the periwinkles, and the dogbanes are characteristic members.

#### WILLOW AMSONIA

*Amsonia tabernaemontana* Walt.

(See Page 98)

This representative of the dogbane family is a midsummer flower, with a range extending from New Jersey to Illinois and from Florida to

Texas. Starting out as a hairy-leaved youngster, on reaching maturity its foliage becomes as smooth as ivory. It blossoms from April to July. The corolla tube is hairy inside.

### DOGWOOD FAMILY

#### *Cornaceae*

The dogwood family is made up of about 16 genera and 85 species of shrubs and trees, and is most abundant in the Northern Hemisphere. Included in it are the tupelos, the bunchberries, and the dogwoods.

This family is one of ancient lineage and distinguished associations. Virgil refers to the javelins made of myrtle and cornel wood which pierced the body of Polydorus. Pausanias mentions a festival celebrated in honor of Apollo at Lacedaemonia, which was instituted by the Greeks to appease the wrath of the god at their having cut down the cornel trees on Mt. Ida. Romulus, wishing to enlarge the boundaries of Rome, hurled his spear to mark the extension permitted by the gods. It stuck into the ground on Palatine Hill, and from the handle, made of cornel wood, grew a fine tree—an event held to foreshadow the greatness and strength of the Roman State.

### FLOWERING DOGWOOD

#### *Cornus florida* L.

#### Virginia State Flower

(See Page 102)

When Virginia's legislature came to consider the choice of a State flower a great many people wanted the Virginia creeper—a flower whose very name, wherever it is found, proclaims the good Old Dominion. But someone suggested that Virginians were not climbers and the Virginia creeper was, and in the deadlock that followed the advocates of the dogwood offered it as a compromise candidate. As it was the second choice of almost everybody it finally was unanimously chosen. It flourishes from Maine to Florida, and from Ontario to Texas, ascending to the very summit of Virginia's highest mountains. Its blossoms are beautifully white in the spring and its leaves brilliantly red in the autumn. The flowering season runs from April to June.

### SILKY DOGWOOD

#### *Cornus amomum* Mill.

(See Page 99)

The silky dogwood is one of the aristocrats of its family. It prefers swamps and low, damp ground, and grows almost exclusively amid such surroundings. In territorial limits it is a little less restricted, for it is found from New Brunswick to Florida and wanders as far west as Nebraska. Indigenous to North America, it is usually found in company with the true arrowwood. In the North it is a shrub that seldom grows over 10 feet tall; in the South it becomes a fair-sized tree. It flowers in June and develops fruit before frost time. The berries are a beautiful pale blue with a silvery sheen.

Among the common names by which the silky dogwood is known are silky cornel, blue-berried dogwood, red brush, kinnikinnik, squaw-bush, swamp dogwood, etc.

This species has often served as a substitute for quinine, decoctions being made from the bark and tender twigs. The fresh bark is chopped,

pounded, mixed with alcohol, and filtered; The resulting tincture is of a beautiful madder color and possesses an odor like that of the sugar-cane when its juices are slightly soured. The Indians scrape the inner bark and smoke it in their pipes when tobacco is not available.

### BUNCHBERRY

#### *Cornus canadensis* L.

(See Page 99)

This species is the smallest member of the dogwood family, attaining a height of less than a foot. It is an immigrant, a native of eastern Asia that came as a stowaway to America, where it has spread over a considerable area. Never flaunting itself in profligate profusion in the haunts of men, it is as timid as a wild turkey, seeking the cool quiet of damp, deep woods, where it lives a modest life in company with the partridge-vine, the golden thread, the fern, and the twin-flower, forming a carpet that matches in color and design the rarest rugs of Kermanshah or Bokhara. The bunchberry is equally at home in Labrador and Alaska, and in New Jersey and California, which broadly mark the four corners of its irregular range.

The leaves appear reasonably early, but its delicate little greenish white flowers, with their four surrounding bracts of white that pass for petals, do not come until May. They usually remain until July, after which the plant, tired of debutante days, settles down to the duty of rearing a family of berries. These begin to appear in August, in compact clusters, dressed in as vivid a scarlet as can be imagined. They are as insipid to taste as they are glorious to sight, so far as man is concerned, but for the birds the berries seem to be "done to a turn" in the kitchen of Nature.

### TUPELO

#### *Nyssa sylvatica* Marsh.

(See Page 99)

The tupelo tree occurs between Maine and Michigan on the north and Florida and Texas on the south, preferring a rich, inclined-to-be-swampy soil. Its highest development is reached on the slopes of the southern Appalachians, where it sometimes attains a height of a hundred feet and a stump diameter of five feet. It usually is found in association with the white oak, the tuliptree, the sugar maple, the cucumbertree, the wild cherry, the ash, and the buckeye.

The shape of the tree is variable. Some are tall and graceful; others are broad and squat. When it grows in the forest, the trunk is usually straight and free from defects of any sort. But out in the open the branches are often broken by storms, causing the heart of the tree to decay, thus making it hollow.

Wide of distribution, the tupelo is also a tree with a variety of local names, such as black gum, sour gum, hornbeam, old-man's beard, upland yellow gum, etc. The South calls it the sour gum, the West, the pepperidge, and New England, the tupelo.

The bark is thick, light brown, often tinged with red. In the fall every leaf assumes a rich scarlet hue, making the blazing crown of a hardy tree a notable element in the landscape it graces.

The flowering season of the tupelo is April and May. The blossoms are inconspicuous, the petals



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SWAMP BUTTERCUP  
*Ranunculus septentrionalis* Poir.  
CROWFOOT FAMILY  
(See Page 89)





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**COLORADO COLUMBINE (Upper left)**

*Aquilegia caerulea* James  
CROWFOOT FAMILY  
Colorado State Flower  
(See Page 89)

**PYXIE (Lower)**

*Pyxidanthera barbulata* Michx.  
DIAPENSIA FAMILY  
(See Page 92)

**AMERICAN PASQUEFLOWER (Upper right)**

*Pulsatilla ludoviciana* (Nutt.) Heller  
CROWFOOT FAMILY  
South Dakota State Flower  
(See Page 92)

forming no prominent corolla. The berries are drupes, with a pit inside, and are meaty like a cherry. They are rather bitter until frosts have set in, after which the birds are very fond of them.

The tupelo has been called the King Lear of the forest—an apt designation to any one who has observed a fine tree overtaken by the decay of age. Preyed upon by more than 50 species of fungi, it usually begins to die at the top, which gives it a melancholy aspect as death creeps down toward its lower branches.

## DODDER FAMILY

### *Cuscutaceae*

This family of parasites or strangle-plants consists of a single genus of about 100 species of wide distribution. All of them have white or yellow stems, leaves are reduced to mere scales, and they twine about any available support. They are so rapacious in their habits of robbing their hosts of their juices that they often kill the goose that laid the golden egg—not only robbing their hosts but strangling them as well. In the South it is not uncommon to see large fields of weeds literally yellow with the strangling cords of the dodders, each weed bound hand and foot to its neighbor by this devil's thread.

## COMMON DODDER

*Cuscuta gronovi* Willd.

(See Page 98)

Early in life the dodder is well-behaved, getting its living from the soil in an orthodox fashion. But just as soon as it finds a suitable plant upon which to attach itself, it sends out innumerable tiny suckers that gradually exhaust the juices of the plant upon which it makes its parasitic attack. While it is drinking the life sap of its unwilling host it forgets to maintain its connection with the soil, the stem from the ground wasting away, so that if its host perishes it must die also.

Living off juices other plants have drawn out of the soil, it loses its chlorophyll and becomes a leafless, scale-bearing individual.

The dodder develops an abundant supply of globular seed vessels. These either fall to the ground and sink into the soil or float off in the water to found new colonies.

Known in some places as the love vine and elsewhere as angel's hair, the dodder flowers from July to September and finds its preferred habitat in moist soil, meadows, ditches, and beside streams. Its range is from Nova Scotia and Manitoba to the Gulf States.

## EVENING-PRIMROSE FAMILY

### *Oenotheraceae*

Consisting generally of annual or perennial herbs, with a few species attaining to the stature of shrubs, the evening-primrose family embraces a group of some 400 species, divided into about 40 genera. It has a wide distribution, though America is the home of more members of the family than any other region. The marsh purslane, the seed-boxes, the primrose-willows, the blooming sallys, fireweeds or willow-herbs, the evening-primroses, the sundrops, the gauras, and the enchanter's nightshade, are among the major members of the family. Like all evening- or night-blooming flowers, the evening-primroses are decidedly fragrant. Moths are their principal insect visitors.

## COMMON EVENING-PRIMROSE

*Oenothera biennis* L.

(See Page 106)

Who has not seen the common evening-primrose with its pale yellow flowers "luikin out o' their leaves like wee sons o' the sun" has missed a sight that has gladdened millions of hearts.

In the United States the evening-primrose is a hardy warrior in the competition for existence and is not over-particular as to where it is stationed on the battlefield. Roadsides, dry fields, thickets, and the corners of the old-fashioned worm fence are satisfactory stations for it, and it is equally at home in Labrador and Florida and as far west as the Great Plains and Rocky Mountains.

It is when the sun goes to bed that the evening-primrose's morning dawns. It is one of the denizens of the Great White Way of the Flower City, waking while the world sleeps and sleeping while the world wakes.

As the sun approaches the western horizon this plant awakes and bedecks itself in yellow and white, perfumes itself with the most seductive of sweet-scented odors, and prepares to welcome the sphinx moths that come to tarry and to sip its sweetness through the long and silent night.

Before the dusk grows deep we may behold the visitors arriving and departing and the grand reception in full sway. Now comes a beautiful little moth dressed in rose pink, its wings bordered with yellow; now the Isabella tiger moth, and now another and another. All of them have long tongues, though it has never been charged that they use them for gossip. The nectar cup of the evening-primrose is deep, and the short-tongued moth stands a chance of going hungry.

The primrose, though it revels in the night, is yet somewhat stingy with its favors, for often it will open up only one flower to each stalk. It does this to insist that its messengers who feast on its nectar shall carry its pollen to a flower on another plant.

One night of revelry is enough for a flower of "milady primrose," for when morning dawns the corolla wilts, hangs awhile, and then drops away; and when we see her next day the freshness is gone, and she presents the appearance of one whose dissipations have laid heavy toll upon her.

But if by any chance no visitor has come during the night to sip its nectar and to be pollen bearer for it, the primrose does not close when the moths retire at dawn, but keeps open house for an hour or so in the morning, until the bees can repair the neglect or until a humming-bird can pass that way on its rounds. Toward the end of summer, after a sufficient number of seeds have set to insure the future, the evening-primrose becomes more generous of its sweets and often bids welcome to the bees the whole livelong day.

The evening-primrose must not be confounded with the true primrose of England and the poets, which is a very different plant, belonging to a different family.

## BLOOMING SALLY

*Epilobium angustifolium* (L.) Scopoli

(See Page 107)

Nature appears to detest ugliness as much as she abhors a vacuum, and seems to have created the blooming sally or fireweed as an antidote for one of the ugliest sights a landscape may offer—

burned-over ground; for it is first and foremost among the flowers to labor for the blotting out of these ink spots upon the carpet of the earth.

Blooming sally deserves her name of fireweed, for she seems to be a real Phoenix among the flowers, rising out of the ashes in green and pink robes as though the flame had been her friend.

This plant takes to the fallow field and the dry roadside when it cannot find a burned district to cover, and begins to blossom with the coming of June, and only with the passing of September joins the somber host that marches to its doom when Jack Frost turns executioner with the cutting cold as his ax.

A genuine cosmopolite is this "first aid" to burned-over Nature, for it is not only at home in America from the Atlantic to the Pacific and from Canada to the Carolinas, but also in Europe and in Asia.

The scheme by which this species saves itself from the evil of self-fertilization is the same as is used by the buttonbush, the holding back of the styles from maturity until such time as the pollen from the flower's own anthers is gone. As soon as that happens the down-curving styles bend upward, so that no bee or butterfly that has come to them from another flower can get a single sip of nectar without first giving them numerous grains of pollen dust in exchange.

Blooming sally has a slender, curved, violet-tinted pod in which are nested numerous seeds, each attached to a tuft of fluffy, white, silky thread. When the seeds are ripe, the pod bursts open, and as the winds come along they start the little seed-laden parachutes sailing through the air to destinations whose distance is limited only by the velocity and the duration of the winds.

And so it sends its children far and wide, hoping that each one may land in some hospitable spot, ready with the advent of another summer to become, in its turn, the founder of other colonies.

### COMMON SUNDROPS

*Oenothera fruticosa* L.

(See Page 103)

This species of the evening-primrose family, called by Britton and Brown, *Kneiffia allenii*, by the National Herbarium, *Kneiffia fruticosa*, has a wide distribution in the eastern part of the United States, blooming from late May to late August. It is the ancestor, according to Standardized Plant Names, of the cultivated sundrops known as bush sundrops and Young's sundrops. It is a day-blooming species, although belonging to an evening- and night-blooming family, and a field of sundrops is a sight not to be forgotten. I have kept them fresh in vases for a full week in spite of their delicate yellow flowers.

### FIGWORT FAMILY

*Scrophulariaceae*

This family, which includes herbs, shrubs and even trees, is made up of some 2,700 species, grouped into 165 genera, widely distributed, but most abundant in temperate regions. The great majority of the species are, of course, herbs, most of them with bitter juices and some of them narcotic and poisonous. It is a most interesting family with all its species having enough characteristics in common to link them as a family in the great kingdom of plants and yet able to express their

individuality in many striking and even fantastic forms.

Some of the representative and familiar members of the family are mulleins, the toadflaxes, the snapdragons, the figworts, the turtleheads, the pentstemons or beardtongues, the monkeyflowers, the hedge-hyssops, the false pimpernels, the speedwells, the foxgloves, the painted-cups and paintbrushes, the eyebrights, the woodbetonies or louseworts, and the cow-wheats.

From one of the foxgloves comes the digitalis so widely used in medicine in the treatment of various diseases of the heart.

### NARROWLEAF PAINTED-CUP

*Castilleja linariaefolia* Benth.

Wyoming State Flower

(See Page 115)

Some years ago the school children of Wyoming, feeling that their State ought to have a duly chosen queen of the flowers, undertook to elect one. They chose the dainty and universally admired fringed gentian. But while no flower is more beautiful, many people in Wyoming thought there were others more representative and typical of their State. This feeling culminated in legislative action in 1917, with the result that beautiful Queen Gentian had to abandon her throne to the narrowleaf painted-cup or Indian paintbrush.

Most of the *Castilleja* tribe are inclined to be parasitic in their habits. Instead of sending out rootlets themselves in order to absorb the plant food and moisture that Nature provides, some of them send their roots down into those of other plants and feast all summer long.

Wyoming's flower, while not possessed of the deep hue characteristic of the *Castilleja* tribe—declared by one of our leading botanists to be "the brightest spot of red the wild palette can show"—makes up in delicacy what it lacks in intensity. The blossom is light red, with touches of soft yellow and hints of salmon pink.

No traveler in the Rocky Mountains, the High Sierras, or the sagebrush regions of the Great Basin can forget the painted-cups or Indian paintbrushes. Where they dwell among the blue lupines, the yellow mimulus, and other bright blossoms, they perfect a combination of hues that transforms the veriest riot of color into an orderly aggregation of polychromatic beauty.

### INDIAN PAINTBRUSH

*Castilleja coccinea* (L.) Spreng.

(See Page 103)

Flourishing in meadows and moist thickets from Maine, Ontario, and Manitoba to North Carolina and Texas, blooming from May to July, and wearing such neighborhood names as red Indians, wickawee, election-posies, bloody-warrior, and nose-bleed, the Indian paintbrush justifies Thoreau's remark that it reminded him of a flame when it first appears. "It is startling to see a leaf thus brilliantly painted, as if its tip were dipped into some scarlet tincture, surpassing most flowers in intensity of color," he added.

### MOTH MULLEIN

*Verbascum blattaria* L.

(See Page 107)

The moth mullein is another of those hardy immigrants of the weed world that has traveled up and down the lanes of international commerce,





WILLOW AMSONIA  
*Amsonia tabernaemontana* Walt.  
 DOGBANE FAMILY  
 (See Page 92)



COMMON DODDER  
*Cuscuta gronovi* Willd.  
 DODDER FAMILY  
 (See Page 96)



BUNCHBERRY (Lower Left)  
*Cornus canadensis* L.  
 DOGWOOD FAMILY  
 (See Page 93)

TUPELO (Upper)  
*Nyssa sylvatica* Marsh.  
 DOGWOOD FAMILY  
 (See Page 93)

SILKY DOGWOOD (Lower Right)  
*Cornus amomum* Mill.  
 DOGWOOD FAMILY  
 (See Page 93)

gained a foothold in the United States, and overrun the country almost from ocean to ocean and from lakes to gulf. For it the marsh and meadow have little attraction. It prefers the dry, open land of roadside and field, and while the grass of the pasture may be parched in the dry, hot dogdays, the moth mullein, like its larger sister, the great mullein, is somewhat akin to the cactus in its ability to resist drought. If all of the cultivated plants that grow in the garden and on farms could defy dry weather with as much success as the mullein, every year in America would be a bonanza crop year. Its flowering time is from June to November.

The moth mullein for many a year has been a rural moth ball. The country dwelling-housewife has used its leaves in packing away woolen garments of winter to keep out the tiny cloth moths of summer. It is also believed to be a bane to cockroaches, from whence comes the latter part of its scientific name.

John Burroughs was able to see much beauty in this plant in spite of its belonging to the category of weeds. He once declared it a favorite of his, which reminds one of a remark of Dr. Liberty Hyde Bailey concerning the dandelion. He declared that mental attitude has much to do with the attractiveness of flowers—that if a man could only bring himself to think so, a dandelion might be as fair a touch to a lawn as a hyacinth.

### COMMON TOADFLAX

*Linaria vulgaris* Hill

(See Page 110)

The common toadflax is another flower that prefers to dwell in the open among men rather than in the forests among the trees. It inhabits waste lands, roadsides, and fallow fields, and blooms from June to October, continuing to add its orange and yellow color to the landscape until the frost comes upon the pumpkins and the fodder has been gathered into the shock. It is an immigrant, having come originally from Asia by way of Europe; but it has already spread from Nova Scotia to Nebraska and Virginia.

The toadflax is preëminently a bumblebee's flower. If other insects visit it, they have a very difficult time to persuade it to give them a sip of its nectar. The doors to its honey wells are always closed, and are so hinged that nothing but a heavy bee can push them open. The honeybee is too light to operate them, and usually departs hungry.

When the bumblebee alights on the lower lip of the flower, its weight causes the door to open and the sign of welcome to be displayed. The bee enters, sticks its pump-like tongue down into the cup of nectar, and takes a draught. While it is doing this it is receiving in its turn a liberal dusting of pollen and depositing some of that which it received from the flower previously visited. Then it backs out, flies away to another blossom, while the door closes after the departing guest.

Having a hearty dislike for ants, the toadflax has built itself breastworks which can withstand every attack they make. It covers itself with bristly hairs, all pointing in the direction of possible invasion, and the ant armies that can successfully overcome this preparedness program are few and far between.

The plant has many qualities that protect it, among others the acidity of its juices. Housewives, in the days when everything was home-

made, mixed its juices with milk, and the result was an excellent fly poison. They also made an infusion from its leaves, which they administered to ailing chickens in the spring.

The aliases of the toadflax are many. In some localities it is called butter-and-eggs, while elsewhere eggs and bacon, flaxweed, and gallwort are names used to designate it.

### COMMON MULLEIN

*Verbascum thapsus* L.

(See Page 111)

The mullein is a lover of dry fields, banks, and stony waste lands. An old abandoned grass field is its particular preference, and it grows there in numbers that are very discouraging to the lad with a hoe who has been assigned to the task of waging a single-handed war of extermination against it. It flowers from July to September all over the northeastern part of America and in Europe and Asia as well.

Like many of its fellow members of the figwort family, the mullein looks like something else. In some places it is called the taper flower because its tall stalk seems a "taper tall" carried by the witches in the olden days. In other places it is called Aaron's-rod, shepherd's-club, and Jacob's-staff.

An immigrant, the mullein has been with us in America so long that Europe has almost forgotten the fact that it is a native of that continent. In the popular mind there it is a native of America. The Irish cultivate it in their flower gardens and call it the American velvet plant; but, in reality, it is an immigrant which has made itself decidedly at home on our shores. It came over as a stowaway, riding in the ballast, like many another weed that has developed the instincts of the globe-trotting hobo.

The name velvet plant comes from the soft, velvety appearance of the mullein's leaves. Being forced to endure intense heat in summer by reason of its preference for an open situation on a sunny hillside, it needs some check to keep it from transpiring too freely; and being under the necessity of enduring intense cold in the winter by reason of the open, unprotected situations in which it finds itself when in the year-old rosette stage, it has had to find something in the clothing line capable of acting as a sunshade in summer and an overcoat in winter.

If you examine this sunshade or overcoat—depending on whether you study the plant in summer or winter—you will find it made of many minute and interlacing hairs which are equally efficient in keeping out the cold and heat.

This velvety coat has its romantic as well as its commonplace uses. We are told that rural maidens rub their cheeks with it and thus produce that peach blossom effect that the best rouge and enamel can never give them; and also it is said that humming-birds gather the downy velvet from the leaves to make their nests.

The mullein has had many uses. The Romans dipped the stalk into tallow and used it as a funeral torch. In the Middle Ages it was used as a candlewick by many people. It is reputed to have medicinal virtues for both man and beast, smoking dry mullein leaves and drinking mullein tea being resorted to by those having colds. It won, in England, by reason of its reputation as a healer of cattle diseases, the name of bullock's lungwort.



## COBAEA PENTSTEMON

*Pentstemon cobaea* Nutt.

(See Page 114)

This attractive member of the figwort family, which grows to a height of one to two feet, is essentially a Mississippi Valley resident. In the guise of cultivated flowers, varieties of this species have, like the black-eyed-susan, reversed the usual history of plant migrations and have crossed to Europe, where they are highly regarded.

Most of the species of the genus are western flowers, and only three species are found in the East. Flowering time comes in the late spring and lasts through the early summer, the plants being found mainly in dry, rocky regions, where they impart, when blooming, a peculiarly soft hyacinth-like effect to the landscape.

*Pentstemon cobaea* is like most of the other species of the family in having a sterile filament that is bearded, and from this it gets its garden alias, the beardtongue.

## FERNLEAF FALSE-FOXGLOVE

*Aureolaria pedicularia* (L.) Raf.

(See Page 114)

This bright member of the figwort family, growing from one to three feet tall and having lemon-colored, bell-shaped flowers an inch or more in diameter, would be worthy of cultivation if it were not a dangerous companion for the honest folk of the flower garden. In the biographies of the dodder and the mistletoe we see how honest plants have degenerated into vampires—blood-suckers that live not by their own toil, but by invading the vitals of other plants for sustenance.

The fernleaf false-foxgloves have only recently started on this downward path, but they have gone far enough to wrap their roots around those of other plants and steal their juices. Knowing their traits, no gardener will invite them into his garden, and they must therefore be content to live on the borders of dry woodlands and thickets in their natural range, which is from Maine west and south to Minnesota and Missouri.

## PINK TURTLEHEAD

*Chelone lyonii* Pursh

(See Page 114)

Growing in ditches, beside streams, and amid swamps, this turtlehead has many aliases in the vernacular. In some localities it is called snake-head, in others codhead. Some people call it shell-flower, while others have christened it balmony.

Its flowering season is from July to September and it is found in swamps and wet thickets in the mountains from Virginia southward. It attains a height of from one to three feet. The leaves are reputed to have tonic properties in the treatment of liver complaints.

Even bumblebees have difficulty in reaching the overflowing nectar cups of the turtlehead before it reaches maturity; but as soon as the heart-shaped anthers have their dust bags of pollen powder ready, the flower opens wider and the visitors have their fill of sweets while taking their dusting of pollen.

## EARLY WOODBETONY

*Pedicularis canadensis* L.

(See Page 115)

The early woodbetony flowers from April to June from Nova Scotia to Florida and westward to the Rocky Mountains. It has a preference for dry woods and thickets and in Virginia ascends to 3,000 feet elevation.

Vernacular names for this flower include the following: high heal-all, beef-steak-plant, louse-wort, and snaffles. It is a slightly hairy species. The four stamens are protected from the rain, or other pollen-destroying agents, by a hooded upper lip. Looking down on the tousled spike, it discloses a rip-saw symmetry. This is enhanced if the flower is plucked and twirled between the thumb and forefinger, the illusion becoming real and amusing. As the pansy reveals the face of an old man or woman, the woodbetony shows the head of a walrus, even to the spike-like projections resembling that animal's tusks. The flowers are so arranged that the bumblebee, their favorite guest, can quickly visit the whole group.

## EASTERN PENTSTEMON

*Pentstemon hirsutus* (L.) Willd.

(See Page 115)

Flowering in midsummer, over a territory that stretches from Ontario and Manitoba to Florida and Texas, the eastern pentstemon is a member of the versatile figwort family.

Its preferences in matter of environment lead it to dry or rocky fields, thickets, and open woods.

Its blossom first develops stamens and is therefore in the first stage of its existence a male flower. When these have given their pollen to the bees they are succeeded by pistils, which transform the blossom into a female flower. Thus cross-fertilization is assured.

The scientific name comes from the densely bearded, sterile fifth stamen. This stamen makes a series of curves from the upper to the under side of the flower, a fact which makes it serve admirably in closing the mouth of the flower against pilfering invaders. A long-tongued bee has to thrust its head deep into the flower in order to get a sip of nectar, and in this way gets a face-dusting of pollen, which is communicated to the pistils of other flowers visited.

## HOLMS GERARDIA

*Agalinis holmiana* (Greene) Pennell

(See Page 103)

This is one of a dozen or more species of purple foxgloves found in the United States. It frequents pine barrens, dry woods, and open fields from New Jersey and Florida westward to Texas, and has a blooming period that begins in August and runs to October. It is an annual and grows from one to two feet tall.

## FLAX FAMILY

*Linaceae*

This is a small family of herbs and shrubs made up of about 14 genera subdivided into approximately 160 species. Slender and frail-flowered, they have given the world its linen since time immemorial. The flax plant, under cultivation, yields the seeds



FLOWERING DOGWOOD  
*Cornus florida* L.  
DOGWOOD FAMILY  
Virginia State Flower  
(See Page 93)



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INDIAN PAINTBRUSH  
*Castilleja coccinea* (L.) Spreng.  
FIGWORT FAMILY  
(See Page 97)



COMMON SUNDROPS  
*Oenothera fruticosa* L.  
EVENING-PRIMROSE FAMILY  
(See Page 97)



HOLMS GERARDIA  
*Agalinis holmiana* (Greene) Pennell  
FIGWORT FAMILY  
(See Page 101)



known as linseed, the oil of which is of great commercial value. Flaxseed poultices, flaxseed meal, and flaxseed oil are by-products of the flax-growing industry.

### STIFF YELLOW FLAX

*Linum medium* (Planch.) Britton

(See Page 118)

No claims to superior beauty can be made on behalf of the subject of this sketch, for, stiff-stemmed, close-leaved, and small-flowered, it is neither graceful nor gorgeous.

The professional botanist tells us that "its leaves are acute, erect, or ascending; pedicels short; inner sepals commonly erose or somewhat glandular-ciliolate." Which means, in everyday words, that the leaves are sharp-pointed and grow upward, hugging the stalk; that the little stems on which the flowers grow are short; that the outer coverings of the buds have a gnawed and hairy appearance at the edges.

The range of the stiff yellow flax extends from Vermont and Ontario southward. It prefers a dry or sandy soil. The honeybee is its principal pollen carrier.

### FOUR-O'CLOCK FAMILY

*Allioniaceae*

This family consists of herbs in our latitude, but some tropical species are shrubs or even trees. There are some 350 species in the family which group themselves into about 25 genera. In our latitude the umbrella-worts and the sandverbenas are the principal four-o'clocks. They are mainly Mississippi Valley plants, but a few of them have established themselves east of the Appalachian range.

### HEARTLEAF UMBRELLA-WORT

*Allionia nictaginea* Michx.

(See Page 118)

This umbrella-wort flourishes in dry soil from Manitoba southward to Louisiana and Texas, and as far west as Colorado. It has followed the black-eyed-susan eastward and has reached the environs of Washington. Growing from one to three feet tall, it puts forth its flowers from May to August inclusive.

### FUMITORY FAMILY

*Fumariaceae*

The fumitory family consists of smooth, tender herbs with a watery juice. In it there are listed 5 genera and about 170 species occurring mainly in the North Temperate Zone and South Africa. Characteristic members of the family are our old familiar Dutchmans-breeches, the squirrelcorn, the bleedinghearts, the several fumitories and the various species of corydalis. Some authorities call the fumitory family the fumewort family and others place its members in the poppy family.

### PINK CORYDALIS

*Capnoides sempervirens* (L.) Borck.

(See Page 119)

The pink corydalis is never intrusive, and would rather please the eye of man than get in his way. In New England it almost supplants the Dutchmans-breeches. The stem is slender and erect and the stalk grows from eight inches to two feet tall. It prefers rocky soil and its range is from Maine to the Carolinas and westward to Minnesota.

### DUTCHMANS-BREECHES

*Dicentra cucullaria* Bernh.

(See Page 118)

The Dutchmans-breeches gets its English name from its close resemblance to the conventional balloon-legged trousers of our friend, Fritz. The Latin name signifies that it is two-legged breeches for Fritz instead of a skirt for Gretchen, as it were. Blossoming in April and May, over a range that reaches from Nova Scotia and Minnesota to North Carolina and Kansas, its feathery leaves and delicate, humorous-looking flowers are always dainty and attractive. The bumblebees and long-tongued butterflies are its favorite guests as short-tongued insects cannot sound the depths of its nectar cups. When placed under gauze and its favorite visitors excluded, it fails to set seed.

### GENTIAN FAMILY

*Gentianaceae*

A family of bitter and usually hairy herbs, the gentians include some 700 species grouped into about 70 genera. They are widely distributed, though most abundant in temperate climates. The gentians get their name from King Gentius, of Illyria, who is reputed to have discovered their medicinal value. The gentian of the drug store is the dried rhizome of the yellow gentian of Europe, which is used in making tonics or bitters. The family includes the centaureums, the rosegentians, the gentians, the pennyworts, and the bartonias.

### FRINGED GENTIAN

*Gentiana crinita* Froelich

(See Page 122)

The fringed gentian lives in low, moist meadows and woods, and begins to blossom when most of its friends of the flowery kingdom have gone to seed and to death. One meets it from Quebec to Georgia, and as far west as the region beyond the Mississippi River.

When this handsome but late comer arrives even the birds have nearly all flown and their songs are only a memory, while the color of autumn is largely that of leaves which have arrayed themselves in the bright-hued garments in which they bid their parent trees farewell. It seems, indeed, that the poet was right who wrote that the fringed gentian comes with its merry blue to cheer the melancholy days that portend the passing year.

In order to insure the production of a full supply of fertile seeds, it has adopted methods protecting it against self-fertilization. The stamens mature and lose their power to fertilize before the pistils are developed, and it thus saves itself from that harmful inbreeding to which only flowers low down in the scale of floral existence resort.

The fringe of the gentian adds grace to it, but that was not the flower's thought in providing the fringe, for even the most lovely of flowers is utilitarian in its instincts. The ants, long generations since, developed a fondness for the nectar of the gentian; great hordes of them overran it and drained its nectar cups. But, since the flower had taken precautions to insure cross-fertilization, it could not afford to have the ants pilfer the nectar which was the currency with which it rewarded the bees and butterflies for their assistance in its new plan of fertilization. Therefore, like the common toadflax, espousing the cause of preparedness, it developed a system of defenses against ant invasions that is remarkable alike for its thoroughness and its beauty.

## CLOSED GENTIAN

*Gentiana andrewsii* Griseb.

(See Page 119)

This member of the gentian family is the commonest of all its tribe in the East. It is remarkable for its tight-closed, bottle-shaped flowers of a blue that approaches ultramarine in intensity. Thoreau spoke of its "transcendent blue, light in the shade and turning purple with age." Occasionally some degenerate plant raises a crop of white flowers.

There is, perhaps, no other plant better fitted for late appearance than the closed gentian. It blooms only a few weeks ahead of Jack Frost, when short days and chilly nights discourage most of the flowers, and the deep-tinted blossoms hold themselves firmly closed, as though to protect the delicate stamens and pistils of their reproductive systems from the sharp touches of the aging year.

The bumblebee knows that the closed gentian has prepared a feast for its special delectation. This is a cup of nectar denied to the rabble by the flower's tightly closed doors and supplied to the bumblebee, which forces its way into the closed corolla. The flower dusts the bee with pollen while it sits at her table, and the insect carries this to its next host.

The favored haunts of the closed gentian are along the edges of rich woodlands, and its range is from Maine to South Dakota and from Georgia to Missouri.

## ROSEGENTIAN

*Sabatia angularis* (L.) Pursh

(See Page 119)

This species of gentian occurs in rich soil and thickets over a range that extends from New York to Florida and from western Ontario to Oklahoma and Louisiana. Its flowering time is in July and August. Some of its vernacular names are bitter-bloom, rose-pink, bitter clover, pink-bloom, and American centaury.

## GERANIUM FAMILY

*Geraniaceae*

This family of about 12 genera and 470 species is distributed through most temperate lands, though most species are natives of South Africa, whence our cultivated geraniums come. It includes the red robin, the geraniums, the several cranesbills, and the alfileria or heronbill.

## WILD GERANIUM

*Geranium maculatum* L.

(See Page 123)

This graceful flower, purplish pink or lavender in color, comes in April and goes in July. It has a preference for woods, thickets, and shady wood-sides, and does not seek the open field with its hot sunshine. As far north as Newfoundland, as far south as Georgia, and as far west as the Father of Waters it finds hospitable grounds on which to dwell.

Legend tells us that the geranium is a miracle-made descendant of the mallow. It relates that once the prophet Mohammed had occasion to wash his shirt on the bank of a stream. He then laid it on some mallows to dry. When they discovered the fact that theirs was the honor of supporting the garment of the Prophet, they blushed at the thought of such distinction and

turned forthwith into geraniums, which they have remained ever since.

The wild geranium depends entirely upon the bees for its propagation, since it has reached that stage of plant development which renders it incapable of self-fertilization; the pollen is ripe and the anthers have fallen away before the stigma becomes receptive. It is a plant that shoots, so to speak; for when the seeds are ready to be spread abroad, the pod, under the process of drying out, sets a spring; when the seeds are dry enough and hard enough to fare for themselves in the world, the trigger to this spring is pulled by the drying process and the seeds are catapulted some distance.

For generations the world knew nothing of the community of interest between the plant kingdom and the insect world; and then Sprengel, the great botanist, observing the German cousin of the American wild geranium, came to the conclusion that the flower is fertilized by the transfer of pollen by the insect that comes to partake of its nectar.

It was many years later, long after Sprengel had been gathered to his fathers, that Darwin came along with conclusive evidence that Sprengel had told the truth, though not the whole truth. He showed how cross-fertilization is accomplished by insects, and that in the competition for existence the cross-fertilized plant has a great advantage over the one that is self-fertilized.

The plant that led Sprengel to guess at the intimate relationship between the insect world and the flowery kingdom was an unfortunate one for him to put forth to substantiate his case, since he had supposed that the insect caused the flower to fertilize itself, whereas it always protects itself against that very thing. He had not gone far enough with his reasoning to understand that cross-fertilization is the rule, and self-fertilization the exception, among flowers.

It is generally thought that only the larger bees are the wild geranium's benefactors, for the ordinary little yellow butterfly that one sees along the mud puddles on the country road is a pilferer, while the small bees more often than not drink its nectar without coming in contact with its pollen.

## GINSENG FAMILY

*Araliaceae*

This family, made up of about 52 genera subdivided into some 475 species, is found in most temperate and tropical regions. In it are included not only herbs and shrubs, but even some trees. Representative species are the devils-walkingstick, the American spikenard, the wild-sarsaparilla, the American ginseng, the dwarf ginseng, and the devilsclub.

## DWARF GINSENG

*Panax trifolium* L.

(See Page 126)

The dwarf ginseng dwells in moist woods and thickets over a range that reaches from Nova Scotia and Ontario and from Georgia to Iowa. Its flowering season runs from April to June. It has a warm aromatic taste and boys roaming the woods like to chew its roots.

## GOOSEBERRY FAMILY

*Grossulariaceae*

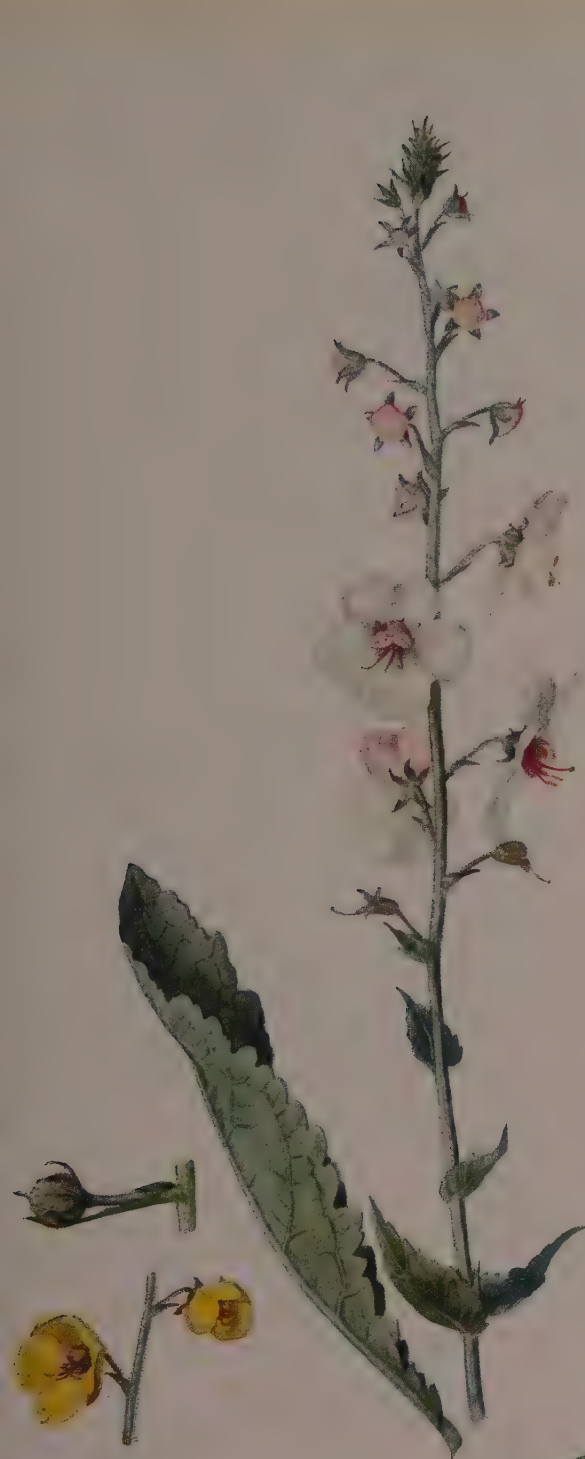
The gooseberry family has 2 genera and about 120 species, mostly native of the Northern Hemisphere and especially of North America. All of



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COMMON EVENING-PRIMROSE  
*Oenothera biennis* L.  
EVENING-PRIMROSE FAMILY  
(See Page 96)





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MOTH MULLEIN  
*Verbascum blattaria* L.  
FIGWORT FAMILY  
(See Page 97)



BLOOMING SALLY  
*Epilobium angustifolium* (L.) Scopoli  
EVENING-PRIMROSE FAMILY  
(See Page 96)

them are shrubs, some of which are valued for their beauty and others for their fruit. The European gooseberry has been so developed that varieties of it produce berries that weigh an ounce. The currants are also members of the family. Gray puts the whole gooseberry and currant clan in the saxifrage family.

### WAX CURRANT

*Ribes cereum* Douglas

(See Page 126)

This beautiful member of the gooseberry family is one of the many species of currants, and is a close relative of the white-flowered currant, for which it is sometimes mistaken. It is without prickles and its fruit is insipid.

### GOOSEFOOT FAMILY

*Chenopodiaceae*

This family consists mainly of annual or perennial herbs though there are a few species which attain to the stature of shrubs. It is composed of some 75 genera, with about 550 species found over a wide geographic range. Spinach and beets are cultivated species of this family. Included in it also are the Good-King-Henry, the Jerusalem-oak, the saltbushes, the garden orach, and the glassworts.

### LAMBS-QUARTERS

*Chenopodium album* L.

(See Page 127)

This member of the goosefoot family is also known as pigweed, white goosefoot, wild spinach, frost-blite, baconweed, muckweed, and fat-hen. It is an extremely common weed throughout North America except in northern Canada, and blooms from June to September. Its succulence makes it a favorite of hogs living in pens.

### GOURD FAMILY

*Cucurbitaceae*

The gourd family consists of about 90 genera and 700 species occurring mainly in tropical regions, with a few species braving the frost line. To it belong the pumpkins, the squashes, the cushaws, the cucumbers, the gherkins, the cantaloupes, the watermelons, the mock-cucumber, and the star-cucumber.

### MOCK-CUCUMBER

*Echinocystis lobata* T. & G.

(See Page 127)

Growing along moors and in waste places over an area that reaches from New Brunswick to Manitoba and from Virginia to Texas, and flowering from July to September, the mock-cucumber is mainly an introduced plant in the eastern part of its range. Among its aliases are wild cucumber, wild balsamapple, mock apple and creeping Jenny.

### GRAPE FAMILY

*Vitaceae*

The grape family consists of climbing woody vines and erect shrubs widely distributed over the earth. It is made up of about 10 genera subdivided into approximately 500 species. To it belongs not only the Virginia creeper, but also the monkshood-vine, the peppervines, the treebines, and the gloryvine, in addition to the many species of grapes.

### VIRGINIA CREEPER

*Ampelopsis quinquefolia* Michx.

(See Page 129)

The Virginia creeper is a member of the grape family, cousin alike to the sour frost grape of the woods and the luscious Concord of the vineyard. It has been called the false grape, although it is too fair a plant to be labeled "false" by man. No lover of the woodland will ever be made to believe that the Virginia creeper essays a rôle to which it is not entitled. Some people mistakenly call it the woodbine, but that name more properly belongs to another plant, of the honeysuckle family.

Many people confuse the Virginia creeper with the rascally poison-ivy, a confusion which nothing but carelessness in remembering the characteristics of plants could bring about; for the Virginia creeper is careful always to put forth five leaves where the poison-ivy has only three.

This graceful climber has traveled as far north as Newfoundland, as far south as Cuba, and as far west as the western part of the Mississippi Valley.

It lives true to its name, creeping on and on, securing a new foothold here and another there, sending out its tendrils as it grows. When one of these succeeds in arranging its branches so that they can press upon any surface, its curved tips swell and become bright red. On their under sides they form little disks or cushions, which attach themselves to the surface and afford a new foothold for the vine.

It is surprising how much weight one of these little disks can bear. Darwin tested their strength and found that one of them will stand a strain of two pounds, while five of them grouped together on a tendril can bear a weight of ten pounds.

What is more picturesque than the old-fashioned stone fence, or the stake-and-rider worm fence, with its load of green foliage in summer and its clusters of bright blue berries in the fall! Over fences, walls, and trees the plant rambles on, and, while it seems to love its wild life best, it will gladly adopt one's very doorstep as its home, and welcome an opportunity to weave a curtain of living green over the sunny sides of the veranda.

In the autumn its blood-like sprays are outlined against the dark evergreens about which they twine, making a contrasting picture of rare beauty. The Virginia creeper has, perhaps, more honor abroad than at home, being widely cultivated in Europe. Even in Venice one may see it covering crumbling walls or gracefully clinging to carefully prepared trellises.

### GRASS FAMILY

*Poaceae*

For the story of the Grass Family see Page 28.

### TIMOTHY

*Phleum pratense* L.

(See Page 131)

There is no grass of the field more familiar than the timothy, with its tall, bright green stalk, its succulent blades, and its cattail head. It is the most prized among the haying crops, bringing a higher price per ton than any of the other grasses. In good land, timothy often grows to a height of five and six feet and its heads attain a length of from six to ten inches. The average timothy head

is, perhaps, four inches and contains several hundred tiny flowers. The pollen, dashed with lavender, disperses with the slightest touch and is borne on the wings of the wind on its mission of fertilization.

A provident grass, during the days of abundant moisture in the ground timothy stores up nutriment in bulbous thickenings at the base of the stems, which enables it to survive periods of drought better than the majority of its companions of the field.

Timothy seed is one of the lightest of the grass family, and many a farmer allows acres to pass the haying time in order that the seeds may develop. Usually the timothy harvest comes after wheat and rye are in the barn.

It is believed that it gets its name from a Maryland planter by the name of Hansen—Timothy Hansen—who is supposed to have imported the grass from England in 1720.

### KENTUCKY BLUEGRASS

*Poa pratensis* L.

(See Page 132)

Though attaining its most luxuriant growth in the far-famed bluegrass region of Kentucky, whose limestone soils also produce Burley tobacco, fat cattle, and fleet-footed thoroughbreds, Kentucky bluegrass is by no means limited in its habitat to the State that was once the "Dark and Bloody Ground." Indeed, it is one of the most common of American grasses and claims for its domain almost every limestone area from the Atlantic to the Pacific.

The habit of the bluegrass in spreading by sending up a running rootstock renders it an ideal lawn grass, since it so readily forms a fine turf. It blossoms in June, ahead of the summer grasses, the flowers occurring in a loose panicle of spikelets, each spikelet possessing three or four flowers. In dry or sandy soil the grass is unprosperous-looking and harsh, but where the limestone pasture land has sufficient moisture it grows from two to four feet tall and makes that happy time which is known as "knee-deep in June."

### BARNYARD GRASS

*Echinochloa crusgalli* (L.) Beauv.

(See Page 130)

The familiar barnyard grass sometimes known as cockspur grass is a strong annual, growing from one to four feet tall, possessing wide leaves, and having an affinity for moist, rich soil. The flowers appear from August to October. The plant flourishes throughout North America except in the extreme North.

### PURPLETOP

*Triodia flava* (L.) Hitchcock

(See Page 133)

Purpletop is a perennial, growing from three to five feet in height, with smooth flat leaves. It is found in dry fields from southern New York and Missouri southward. It blooms in August and September, along with the purple eragrostis, and towers above its associates, the busy panic grasses and the slender paspalums. It comes at a time when it can share the sunshine with the pennycroyal and the other mints which are so often found in its neighborhood. The flowering head of the purpletop is somewhat sticky to the touch.

### PERENNIAL RYEGRASS

*Lolium perenne* L.

(See Page 134)

Ryegrass is a perennial, growing in fields and lots, and is commonly considered a weed. Blooming in June, ryegrass is found mostly in the eastern part of the United States and is probably an immigrant from Europe, where it occurs in numerous varieties.

It has the reputation of being probably the first of the grasses cultivated as a forage plant, and since the days of Charles II has been held in high esteem in England. In America other grasses have answered so well the needs of the farmer that the ryegrass does not figure in his cropping system.

A cousin of *Lolium perenne*—*Lolium temulentum*—is supposed by some to have been the tares among the wheat mentioned in the Gospel according to St. Matthew.

In Scotland the seeds of the *Lolium temulentum*, commonly called darnel, bear the name of "sleepies," on account of what was supposed to be the narcotic effect of its seeds. Scientific investigation has revealed the fact, however, that this effect is produced only by those grains which have become diseased through the attack of a fungus.

### REDTOP

*Agrostis palustris* Huds.

(See Page 135)

There are few more interesting grasses than the redtop. It belongs to the bent grasses, which are a group made up of hundreds of species scattered throughout the temperate zones. They monopolize the field and wayside in midsummer as thoroughly as the goldenrod rules the landscape of autumn.

The redtop clothes the land in iridescent tones of reddish purple. One variety used to be known as bonnet grass and is found extensively along the reaches of the Connecticut River. It derived its name from the thrifty habits of the New Englanders of yesteryear, who braided the stems into hats.

The flowers of the redtop occur in cone-shaped panicles, while the glumes are green and whitish with a reddish blush reaching its deepest note in the redtop. The illustration shows an albino form of this species.

### YELLOW FOXTAIL

*Chaetochloa lutescens* (Weigel) Stuntz

(See Page 136)

Belonging to the foxtail group, which includes the millets, this grass is widely distributed. It is very attractive when studied carefully, for the dense, yellowish, cylindrical spike is full of florets, each accompanied by a cluster of bristles the coloring of which is delicate and beautiful. The perfect flower is transversely wrinkled and surmounted by beautifully colored stigmas.

The millets, cousins of the yellow foxtail, were among the most ancient of cultivated grains. Even the lake dwellings of the Stone Age reveal such quantities of these grains as to lead to the conclusion that they must have yielded the principal bread supply of prehistoric men.





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COMMON TOADFLAX  
*Linaria vulgaris* Hill  
FIGWORT FAMILY  
(See Page 100)



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COMMON MULLEIN  
*Verbascum thapsus* L.  
FIGWORT FAMILY  
(See Page 100)

## ORCHARD GRASS

*Dactylis glomerata* L.

(See Page 137)

One of the earliest of the grasses that gladdens the springtime is the orchard grass. The English call it cocksfoot grass because of a fancied resemblance of the branching panicle to the rooster's foot.

This plant is a living example that even among the grasses the prophet usually receives his first recognition abroad; for, although it was brought from England to America, it was never appreciated in the mother country until it acquired its abode here.

The orchard grass spreads its flowering panicles to the winds in the days when the odor of new-blown clover sweeps through the land, and with its anthers ranging from purple and yellow to terra cotta and pink, depending upon the quality of the soil and the quantity of light, it is no mean rival of the clover for recognition.

This species ranks high as a farm grass, since it offers the husbandman pasture for his herds in the springtime and is one of the last to retire before frost.

The flowers of orchard grass are in their glory in June, the stem growing out of a dense tuft of broad leaves.

## HEATH FAMILY

*Ericaceae*

A large and interesting family of about 1,100 species which naturally divide themselves into some 60 genera, the heaths have a wide geographic distribution outside of the tropical regions, which they seldom invade, as a little frost now and then is relished by the warmest-natured among them. Those which do invade the Tropics are usually to be found in the uplands and mountains. For instance, some of the close cousins of the winter-green are to be found in the higher Amazon country. The white heather climbs the highest mountains and finds regions above 10,000 feet particularly to its liking. The common heath of Europe, which is used with oak bark in tanning, or, when young, as fodder, and which is the heather of the British moorlands; the "heather bells" of Scotland so famous in song and story among the Scotch clans; the sweetbells, the azaleas, the rhododendrons, etc., are members of this family.

Many authorities include in the heath family the members of the shinleaf family, *Pyrolaceae*, which embraces the pipsissewas and the shinleaves; the members of the Indianpipe family which includes the Indianpipes, the pinesaps and the sweet pinesaps; and the members of the blueberry family, which includes the dangleberries, the huckleberries, the deerberries, and the blueberries.

The Government botanists, however, set these groups off into closely related, but independent families.

## ROSEBAY RHODODENDRON

*Rhododendron maximum* L.

West Virginia State Flower

(See Page 138)

The superb beauty of the rhododendron has won for it universal admiration and the distinction of being the flower of two States. The legislature of West Virginia and the State organization of women's clubs in Washington have elevated it above all other floral rivals in their communities. The

chosen variety of West Virginia is *Rhododendron maximum*, while that of Washington is *Rhododendron californicum*, also called the coast rhododendron. The latter is the most splendid of western shrubs. Both of these species have delicate, waxen blossoms tinted like the "rosy-fingered dawn," with upper petals flecked with golden and greenish spots.

A true artist in selecting its background, the rhododendron not only surrounds its exquisite blossoms with smooth, rich green leaves which set them off effectively, but also makes its home commonly on moist, forested mountainsides, where the browns and gloomy greens of dark rocks and lofty trees contrast with its dainty pink and white ruffles.

At its best, and rarely, the shrub attains a height of 35 feet. Its form, with spreading branches, twisting and interlocking, calls to mind the Greek meaning of its name, "rose tree." In less favorable locations the plant is sometimes less than five feet high. The wood is one of the strongest and hardest that grows and weighs 39 pounds to the cubic foot.

The rhododendron has no such clever trick of showering its pollen upon insect visitors as the mountain-laurel, but, like the latter it protects itself by exuding a sticky substance below the flower to shield the blossom from ants and crawling insects that do not transfer pollen. The bee and other insect friends of the rhododendron find its nectar very gratifying, but the honey they make from it is said to be poisonous.

To the deeper pink, rather purplish rhododendron of the Carolinas, European gardeners pay the homage of careful cultivation, as they do also to some varieties native to Asia.

Americans might fittingly revive England's "Maying" custom and set aside an early summer day for pilgrimages to our mountains where the mountain-laurel and rhododendron bloom, in order properly to appreciate these perfect gifts of Nature.

## COAST RHODODENDRON

*Rhododendron californicum* Hooker

Washington State Flower

(See Page 138)

Known also as the California rosebay, the coast rhododendron is one of the Pacific region's most charming flowers. It is the species adopted by the State of Washington as its official flower. A splendid shrub, by many regarded as the handsomest indigenous to the Pacific coast, it grows from 3 to 15 feet high and has a grayish trunk. The leaves are from 3 to 10 inches long and are leathery and smooth, but not shiny. The flowers are scentless and the stamens terminate in anthers that resemble tiny serpents' heads.

With richly colored flowers mixed with crimson-tipped buds, and backed by dense green foliage, the shrub gives a striking combination of delicate and brilliant tints, which, met with in such places as the redwood forests, stir the soul of the beholder.

## MOUNTAIN-LAUREL

*Kalmia latifolia* L.

Connecticut State Flower

(See Page 140)

When Connecticut's legislature adopted the mountain-laurel as the Nutmeg State's representative flower, it chose one that is a patrician in its



history, a blue blood in its family relationships, and a Venus in its beauty.

Because it grows in places where the bees and butterflies are not so numerous as they are in the fields, the mountain-laurel has taken care that no visitor shall escape without rendering it the service of a messenger. When the flower opens its stigma is erect, but the anthers are fastened down with a trigger-like arrangement, one on each of ten little pockets in the flower. The bee that creeps down into the flower for a sip of nectar releases a tiny spring like a mouse entering a trap. The released anther flies up and dusts its pollen on the hairy body of the insect. Now, if you take this pollen and put it under a good microscope, you will see that each grain is in reality a cluster of four tiny balls resembling oranges. Indeed, in passing, it may be observed that each species of plant seems to possess some special whim in the shape of its pollen, with its own peculiar devices of exterior decoration and structural form. The mountain-laurel's clusters of tiny balls ride safely on the bee as he flies to the next flower, and as he stoops for a sip of that blossom's honey they are brushed off by the ready pistil and the flower is fertilized.

Since ants can never render it any pollen-bearing service, the mountain-laurel has set traps to protect its nectar from their ravages. It mounts its flowers on hairy stems and covers the hairs with a sticky substance, so that if Mr. Ant does not heed the warnings of the bristles that no trespassing will be allowed he promptly finds himself wading through a field of glue that pinions his feet until he dies an ignominious death as a would-be thief.

No friend of the stock raiser is the mountain-laurel. In the springtime, when the cattle grows in the valleys of the East drive their herds to the grazing farms of the mountains, this is the greenest thing in sight. A winter on dry fodder has made every animal hungry for a change of diet; so that, although the herd is urged on, one nip after another is taken of the mountain-laurel bushes along the roadside, until, the first thing the drover knows, two or three members of his herd have an overdose, with "blind staggers" as a result. Usually a day or two brings the affected cattle around, and once on the range, they seldom or never touch it. Only when there is nothing else green in reach will they leave the straight and narrow way of safe forage to eat the poisonous laurel.

The mountain-laurel is distinctly an eastern plant. It flourishes from New Brunswick to the Gulf of Mexico, but, unlike so many flowers that have kept pace with man as he has carried his civilization westward, it has never crossed the Mississippi Valley. Once there came to the United States a Swedish naturalist, Peter Kalm. After making the acquaintance of our American flowers, he decided that the mountain-laurel was his preference. He gathered some young plants, took them to Europe, and introduced them on many a fine estate. The plant's scientific name, *Kalmia*, was given it as a tribute to this eminent naturalist.

#### TRAILING-ARBUTUS

*Epigaea repens* L.

Massachusetts State Flower

(See Page 139)

The eastern half of North America, from Newfoundland and the Northwest Territory to Florida and the Gulf of Mexico, possesses that delightful little harbinger of spring, the trailing-arbutus or

mayflower, which the legislature of Massachusetts has chosen as the State flower. With its ever-green leaves nipped by the frosts of winter and weatherworn by the cold, relentless battle it must fight for existence through this season; and with its flowers seeming to form Nature's prelude to the fragrance of summer, from the days of Plymouth Rock itself, the trailing-arbutus has gladdened the heart of man as it has proclaimed the dawn of spring. The poet tells us that the mayflower was the first sign that the Pilgrim fathers had that the winter was over, that the springtime was coming, and that the summer was appearing in the distance—not only the winter and the springtime and the summer, climatically speaking, but the winter of the Pilgrims' fear, the springtime of their hopes, and the summer of their realized dreams.

With all of its message of hope and cheer, as it proclaims the ending of the season of snow and harbingers the beginning of the season of bud and blossom, the trailing-arbutus still resists the effort of man to lead it into captivity. No more is the eagle at home in the farmyard or the cardinal in the cage than the trailing-arbutus in the garden. As the imprisoned cardinal pines away and dies when the gilded bars of a bird cage separate it from its liberty, so the Pilgrim's plant lives unhappily and unprofitably in the garden, and finally gives up its effort to adapt itself to its new environment as vain. However, man's patience and skill are finding means of taming this wild flower.

#### FLAME AZALEA

*Azalea lutea* L.

(See Page 140)

With a range that reaches from New York to Georgia and a flowering season that begins in May and ends in June, the flame azalea sometimes masquerades under the name of yellow honeysuckle, although it is not a honeysuckle at all. It is a beautiful and showy species and has been brought under cultivation with much success. So well does it respond to pampering that its finest, showiest flowers are produced by cultivation. It vindicates the rule that handsome flowers are not likely to be fragrant flowers, for it possesses little fragrance. There are about 40 species of azaleas found in North America. *A. nudiflora* is known as the pinxterbloom or wild honeysuckle. *A. canescens*, as the piedmont azalea or mountain or hoary azalea, and *A. viscosa* as the swamp azalea, swamp pink or white azalea.

#### WINTERGREEN

*Gaultheria procumbens* L.

(See Page 139)

The wintergreen, with its warm-hued berries, has many names: checker-berry, boxberry, deer-berry, groundberry, ivy-berry, ginger-berry, grouse-berry, spiceberry, mountain tea, Jersey-tea, Canadian tea, and waxy plum. Its tender leaves are known as little Johnnies, pippins, drunkards, and by other names of like import, though they have nothing whatever about them to suggest stage entrances, or gaiety, or inebriety.

The wintergreen is a woody vine with an underground creeping stem, from which spring erect, flowering branches from three to five inches high. These branches bear at their tops crowded groups of aromatic leaves.

The habitat of the wintergreen is the quiet solitude of damp woods, extending as far north as



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**COBAEA PENTSTEMON**  
*Pentstemon cobaea* Nutt.  
 FIGWORT FAMILY  
 (See Page 101)



**FERNLEAF FALSE-FOXGLOVE**  
*Aureolaria pedicularia* (L.) Raf.  
 FIGWORT FAMILY  
 (See Page 101)



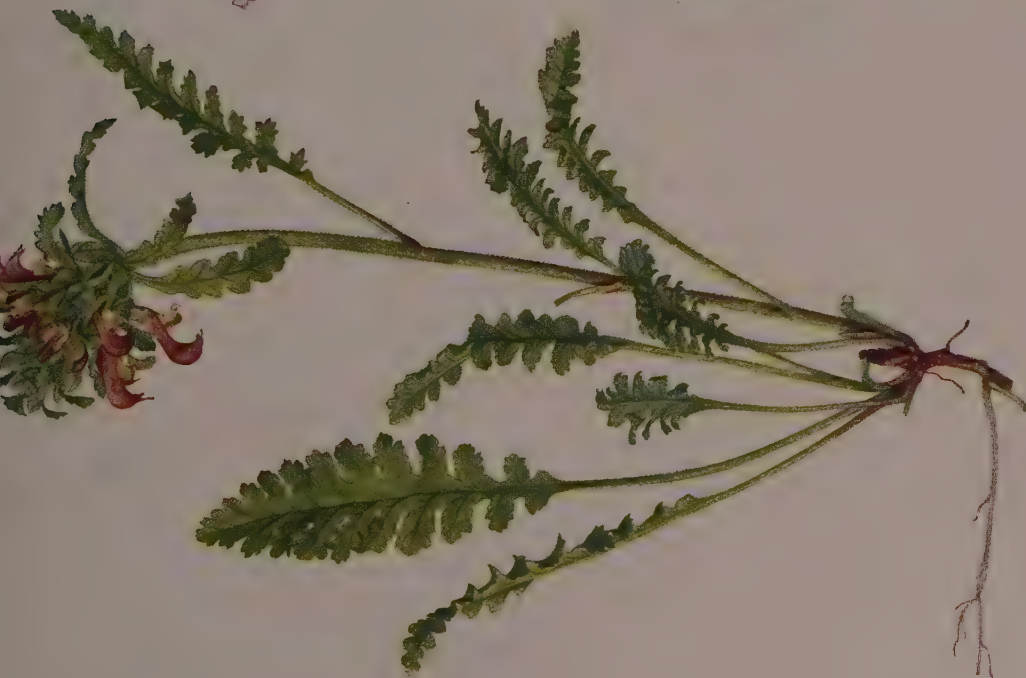
**PINK TURTLEHEAD**  
*Chelone lyonii* Pursh  
 FIGWORT FAMILY  
 (See Page 101)



NARROWLEAF PAINTED-CUP  
*Castilleja linearifolia* Benth.  
 FIGWORT FAMILY  
 Wyoming State Flower  
 (See Page 97)



EASTERN PENTSTEMON  
*Pentstemon hirsutus* (L.) Willd.  
 FIGWORT FAMILY  
 (See Page 101)



EARLY WOODBETONY  
*Pedicularis canadensis* L.  
 FIGWORT FAMILY  
 (See Page 101)

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Newfoundland and Manitoba. Its real headquarters are the Andes Mountains, on whose slopes it appears in nearly a hundred different species. A few species are found in Asia, but wherever it grows it will usually be found under the shade of the pines. Blossoms appear any time between early spring and late fall, and the bright red berries seem to have all seasons for their own. They are so plentiful in southeastern Massachusetts that they are sometimes seen on the fruit stands in the Boston markets.

The spicy, aromatic flavor of the wintergreen appears equally in leaf and flower and fruit. It is the active element in oil of wintergreen, used widely as a scent for soap, a flavor for chewing gum, candy, etc., and as a camouflage for bad-tasting medicines.

One of the strange tricks of Nature appears strikingly in the analysis of the oil of wintergreen. How a little creeping plant can take substances from the soil and air and manufacture them into a compound that is exactly like another preparation compounded in the laboratory of a big, deep-rooted tree, is passing strange. Yet the only difference between the oil of the wintergreen and that of the sweet birch is a slight variation of their boiling points. Well may Newhall ask, "By what alchemy can the little checker-berry vine and a tree—the unrelated black birch—both elaborate from the elements around them the same most pleasant scent and flavor?"

#### LAMBKILL

*Kalmia angustifolia* L.

(See Page 139)

The lambkill is a shrub of lesser proportions than the common kalmia, or mountain-laurel, and its flowers are similar but smaller and of a crimson-pink. They cluster closely around the stem, which is terminated by newer leaves, this again being a point at variance with the larger species.

The range of the species is from Canada to Georgia.

#### HOLLY FAMILY

*Aquifoliaceae*

The holly family is a rather small one consisting of some 300 species grouped in 3 genera and distributed throughout the tropical and temperate worlds. It embraces, among its American members, not only the hollies and the winterberries but also the treleases, the inkberries, and the cassenas. Some authorities call the holly family the *Ilicaceae* instead of the *Aquifoliaceae*.

#### AMERICAN HOLLY

*Ilex opaca* Ait.

(See Page 141)

The American holly occurs from Massachusetts to Florida and from Indiana to the Gulf of Mexico, reaching its greatest abundance in the coast regions, its greatest size in Texas, and its greatest beauty in the Carolina mountains. While in Texas and Arkansas holly trees often attain a height of 45 feet and a diameter of 4 feet, in the North they are rarely more than 10 feet high or more than a few inches in diameter. The holly leaves sometimes hold fast for three years, usually staying until driven off by some ambitious successor. They are stiff, leathery, and spine-tipped.

Few plants are less subject to insect trespassers than the holly, although the leaves are a favorite

food of the caterpillar of the pretty azure-blue butterfly, *Polyommatus argiolus*.

The tree usually blooms in May or June, the flowers being small and greenish white in color.

The fruit is eaten with impunity by birds, though considered poisonous to man. The rare combination of these bright, cheery berries with the shiny green leaves makes the plant much admired. Its beauty, however, is proving, as usual, a somewhat dangerous gift. Unless protected from the axes of the foliage and shrubbery gatherers, there is grave danger that it will disappear in half a century.

The wood of the holly is fine-grained and is employed extensively in cabinetmaking, inlay work, and the manufacture of musical instruments. It is also used for engravers' blocks and for rollers for printing cotton goods.

There are many interesting customs and romantic stories in which the holly figures. It is believed that the custom of employing the holly and kindred plants for decorative purposes at Christmas dates back to the time of the Roman Saturnalia, or else to the old Teutonic custom of hanging the interior of dwellings with evergreens as a refuge for sylvan spirits from the inclemency of winter. Even in Pliny's day the holly had all manner of supernatural qualities attributed to it. Its flowers were said to cause water to freeze; it was believed to repel lightning, and therefore the Romans planted it near their houses; and the story ran that a branch of holly thrown after any stubborn animal, even though it missed him, would serve to subdue him instantly and cause him to lie down meekly beside the stick. Some friends of the plant have suggested that the notion of the Italian peasant that the cattle kneel in their stalls at midnight on the anniversary of Jesus' birth grows out of the survival of the old pagan legend of the effect of the holly upon domestic animals.

In parts of England it is deemed unlucky to introduce the holly into the house before Christmas Eve. In some sections the prickly leaf and the non-prickly leaf species are designated as "she" and "he" holly, and the belief is that, according as the holly brought at Christmas is smooth or rough, the wife or the husband will be master of the household for the ensuing twelve months.

The European relative of the American holly has a leaf more spiny and a berry of a deeper red than our own, but it is too tender to withstand the rigorous winter of the North or the hot summers of the South.

#### COMMON WINTERBERRY

*Ilex verticillata* (L.) A. Gray

(See Page 141)

Flowering in June and July, from Nova Scotia to Florida and westward to Missouri, the winterberry or black alder gladdens the months of snow and ice with its bright fruit. Long after the frost has turned the leaves black and sent them away to enrich the soil for another summer's verdure, its abundant red berries, clinging to leafless branches, dispel the desolation of many a winter scene.

The winterberry is a handsome shrub, growing from 5 to 10 feet high, with dull, warm gray bark and nearly vertical stems and branches. It flourishes especially in low, swampy ground, in Virginia sometimes reaching a height of 25 feet.

This species has qualities that have won for it a place in *materia medica*. The bark is bitter to the taste, and astringent in its action. An infusion made from it, or even from the leaves, has been found to possess tonic and alterative properties. The berries are purgative in their action and serve as a vermifuge, forming one of the pleasantest adjuncts in children's remedies.

During the Civil War the Southern people were hard-pressed for medicines. A survey of the herbal resources of Dixie was made, and the berries and bark of the winterberry were especially commended. They were used in the treatment of intermittent fevers and diseases which developed as a result of debilitated constitutions, especially gangrene and mortification, and as astringents for ulcers and chronic cutaneous diseases.

Just now the winterberry is making a strong bid for favor as a cultivated plant. Showing a great mass of color, holding its berries longer than almost any other species, possessing attractive foliage that never grows shabby, it is ideal for decorative purposes.

## HONEYSUCKLE FAMILY

### *Caprifoliaceae*

The honeysuckle family consists of about 10 genera and 300 species. Only a few of them have crossed the Equator into the Southern Hemisphere, and these few are found in South America and Australia. They range in size from trees to perennial herbs, with shrubs and vines in the majority. The family includes the elders, the viburnums, the horsegentians, the twinflower, the wolf honeysuckle, the snowberry, the coralberry, and the hobblebush or American wayfaring tree. It has been said of the widespread irregular clusters of white bloom, occurring in some species of the honeysuckle tribe, that they suggest heads of hydrangeas whose plans have miscarried. They have two kinds of flowers, large showy unfertile shams on the outside and inconspicuous little fertile blossoms inside of this circle of shams. And yet the plants have found it good salesmanship to use these showy flowers as advertisements leaving the real business of reproducing the species to the more sedate blossoms.

## TRUMPET HONEYSUCKLE

### *Lonicera sempervirens* L.

(See Page 141)

Occurring both in low grounds and on hillsides over a range that reaches from Canada to the Gulf and from the Atlantic Ocean to the Rocky Mountains, the trumpet honeysuckle flowers from April to September. It is a scentless but beautiful species, much cultivated, twining about every possible support and climbing high. Its most frequent and welcome visitor is the humming-bird, though the long-tongued bumblebees and butterflies are well-received guests at its board.

The honeysuckle puts its nectar down deep so that only those who can serve it profitably as pollen carriers may be able to extract the sweets. But the bees—early risers—are astir long before the friends of the honeysuckle have finished their morning nap, and, biting little holes through the tender tissue at the base of the honeysuckle's tube, drink the stolen sweets with gusto. Then, when the butterfly and the humming-bird come to the feast, they find the cupboard bare. The bees have learned the arts of rogues faster than the flower has built up the strength of its defense.

## AMERICAN ELDER

### *Sambucus canadensis* L.

(See Page 144)

Ranging from Nova Scotia to Manitoba and from Florida to Texas, with colonies in the West Indies, the American elder climbs mountains and gladdens valleys alike.

The brittle twigs and young sprouts are full of pith, while the older stalks are nearly solid. The hardy leaves are often seen unchanged in hue, frozen stiff on the stems, in December. So repugnant to insects is the odor of the American elder that an eighteenth century gardener recommends that cabbages, turnips, etc., be whipped with young elder twigs to preserve them from insect ravages. An infusion of elder leaves is often used to-day to keep bugs from vines.

The clustered flowers of the elder remind one of mellow old lace. They give off a heavy, sweetish, and, to many people, a rather sickening odor. The flowers appear from June to August. Elder flower water is much used by the confectioner, and a perfume made with the flowers, distilled water, and rectified spirits serves to flavor wines and jellies. The young buds are sometimes pickled like capers. The dried flowers contain a volatile oil, resin, wax, tannin, etc., and possess stimulating medicinal properties.

The juice of the elderberry was used by the Romans to paint the statues of Jupiter red on festive occasions, and in convivial history has been rather widely used as an adulterant of grape juice.

The specific name is supposed to be derived from *sambuke*, an ancient musical reed instrument—the prototype of the crude hollow-stem elder whistle of the barefoot country boy.

These same hollow stalks of the elder play an important rôle in every maple-sugar camp. Cut into appropriate lengths and inserted in the incisions of the tapped trees, they serve to conduct the rising sap into the waiting pail or sugar trough.

No shrub is more generous with its fruit than the elder. Other crops may fail, but this plant always produces a full harvest, never yielding to the caprices of the season, be it wet or dry, hot or cold.

## AMERICAN CRANBERRYBUSH

### *Viburnum americanum* Mill.

(See Page 142)

The American cranberrybush belongs to the honeysuckle family and has a fruit of the peach rather than of the berry type.

This shrub grows from 3 to 14 feet tall, with smooth stems and gray-brown or buff branches. It is a native of Siberia, and in North America has a range reaching from Newfoundland and British Columbia to New Jersey and Iowa, being variously known as the American guelder rose, the cranberry tree, etc. It thrives best in upland soils, where the true cranberry cannot live.

The familiar snowball tree is a sterile form of the American cranberrybush.

The flowers of this shrub appear in May and June and consist of masses of small, white blossoms.

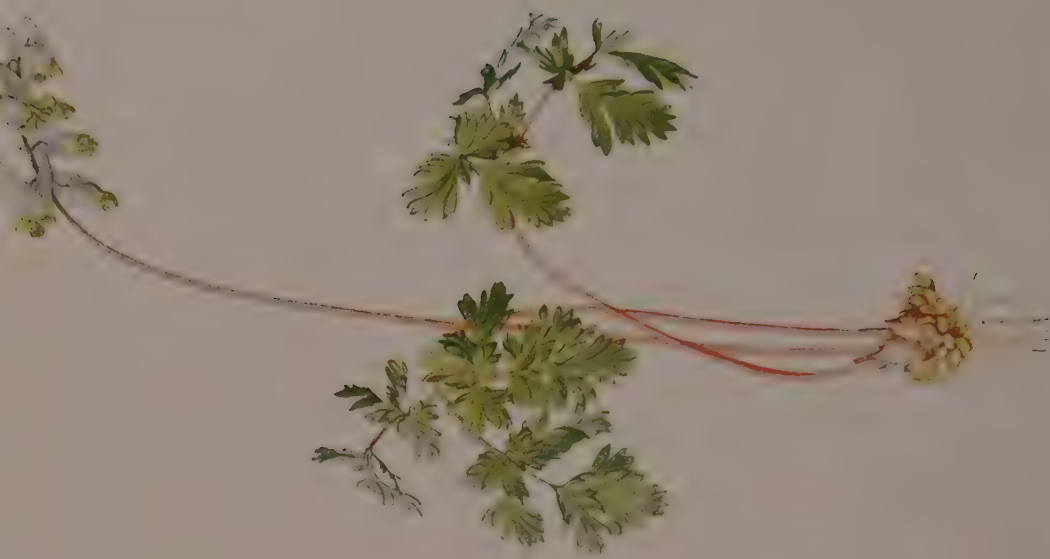
The berries of the fertile plant come in early summer. They remain on the bush all winter, their flavor being too sharp even for the bold appetite of a hungry bird.



STIFF YELLOW FLAX  
*Linum medium* (Planch.) Britton  
FLAX FAMILY  
(See Page 104)



HEARTLEAF UMBRELLA-WORT  
*Allionia nyctaginea* Michx.  
FOUR O'CLOCK FAMILY  
(See Page 104)



DUTCHMANS-BREECHES  
*Dicentra cucullaria* Bernh.  
FUMITORY FAMILY  
(See Page 104)



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PINK CORYDALIS  
*Capnoides sempervirens* (L.) Borck.  
FUMITORY FAMILY  
(See Page 104)



CLOSED GENTIAN  
*Gentiana andrewsii* Griseb.  
GENTIAN FAMILY  
(See Page 103)



ROSEGENTIAN  
*Sabatia angularis* (L.) Pursh  
GENTIAN FAMILY  
(See Page 103)



## BLACKHAW

*Viburnum prunifolium* L.

(See Page 142)

The boy who has not wandered through woodlands and gathered and eaten the smooth bluish black, sweet and edible fruit of the blackhaw has missed one of the pleasures of boyhood. This shrub is a very early bloomer, the flat-topped whitish clusters appearing in April and lasting until July. Its range lies between the Gulf States and New England and Michigan.

## MAPLELEAF VIBURNUM

*Viburnum acerifolium* L.

(See Page 143)

The mapleleaf viburnum is a shrub, from three to five feet high, and, except for its flowers and fruit, would pass almost anywhere as a young maple shoot.

With dense, spreading foliage, the bush has a preference for the shade of woodland thickets. Ranging from New Brunswick and Minnesota on the north to Kentucky and Georgia on the south, it prefers rocky, broken ground rather than damp soils. The heights back of the Palisades of the Hudson are favorite haunts of the viburnum.

A close relative of the snowball tree, this species bears profuse clusters of small, white, scentless blossoms. The fruit is a dark, purplish berry the size of a pea.

## WITHE-ROD

*Viburnum cassinoides* L.

(See Page 143)

This fine shrub blossoms in the early summer and its fruit, first pink and then turning dark blue or blackish, appears in August. It occurs in swamps and wet soil and has a range that extends from Newfoundland to Georgia and from Manitoba to Alabama. The fruit possesses a bloom like that of the huckleberry. Its tough, pliable branches make substitutes for wire and twine in tying rural bundles. Poor mountaineers have frequently used the leaves of the withe-rod as a substitute for tea, hence it is sometimes called Appalachian tea.

Close relatives of the withe-rod are the hobblebush, the arrowwood, and the blackhaw. The viburnums cater to insects with short honey-probes. They mass their flowers in dense heads, and the flower tubes are very short.

## CORALBERRY

*Symphoricarpos orbiculatus* Moench

(See Page 142)

Various known as Indian currant, low woodbine, buck bush, turkey-berry, and snap-berry, the coralberry is an erect shrub, growing from two to five feet high, with purple or madder-brown branches, slightly hairy when they are shoots.

The region gladdened by the presence of this shrub is bounded by New York and North Dakota on the north and by Georgia and Texas on the south. It is a native of the Mississippi Valley.

With a preference for a normal loam or clayey soil, the coralberry thrives best in some grove-like wood where the rivalries of the undergrowths do not make life too hard a struggle. In the summer the delicate short-stemmed leaves are a soft, neutral gray-green. In the fall the bush is trans-

formed; each branchlet, bending beneath its weight of fruit, becomes a wand of delicate red. And as each branch has many spray-like twigs, the whole forms a complex profusion of color, making it deservedly one of America's favorite decorative shrubs.

The Ojibwa Indians call the coralberry "gus-sigwaka-mesh" and use a decoction of it as a remedy for sore eyes.

## SNOWBERRY

*Symphoricarpos albus* (L.) Blake

(See Page 143)

The snowberry is also known as snowdrop, waxberry, eggplant, etc.

It seeks dry limestone ridges and rocky banks. A native of North America, it finds a home almost anywhere, spreading across the continent from Quebec to Alaska and from central Pennsylvania to California. The green, short-stemmed, elliptic-oblong leaves are downy underneath. The bell-shaped flowers, which come in May and June, are pink, but so small as to be inconspicuous.

The berries, which are inedible, form in clusters along the slender branches from late June until after early frosts. Their size ranges from that of a pea to that of a marble, as a substitute for which children often use them.

This species is easy to cultivate. It spreads rapidly from suckers. Often it is planted with its cousin, the coralberry, and a fine, green dooryard studded with snowberry pearls and coralberry beads is a sight fair to behold.

## HYDRANGEA FAMILY

*Hydrangeaceae*

The hydrangea family consists of about 16 genera subdivided into about 80 species. Asia and North and South America represent the principal range of the family. Many species that are not native to America have been imported and adorn American flower gardens and lawns.

## LEWIS MOCKORANGE

*Philadelphus lewisii* Pursh

Idaho State Flower

(See Page 144)

The queen of Idaho's wild flower garden is by unanimous acclaim the modest mockorange or syringa, *Philadelphus lewisii*, which is limited in its territory to the western group of States, from Montana and Wyoming to Washington and California. Its flowers matching the orange blossom in beauty, its bursting buds appearing to be fairy pincushions, its fragrance as delightful as the odors that sweep over Elysian fields, its leaves a delicate, soft, shimmering green, the Idaho mockorange is a shrub well-equipped to awaken enthusiasm in every lover of flowers.

It has many close relatives—various species of *Philadelphus*, which is the botanical name for all the species we, in our common garden variety of nomenclature, call the syringas. There is *Philadelphus grandiflorus*, which grows in the South Atlantic States and is famous for its rich and fragrant flowers; *Philadelphus inodorus*, with the same range, but without the same fragrance; *Philadelphus hirsutus*, dwelling in the North Carolina-Alabama mountains and arraying itself in hairy leaves; *Philadelphus coronarius*, the mockorange of

the Eastern States and everywhere loved for its beautiful and wonderfully fragrant blossoms.

The name syringa, by which the mockorange is so often popularly known, is a misnomer. Ptolemy Philadelphus loved them and they became *Philadelphus* this or *Philadelphus* that. But the world at large wanted a name more to popular liking and by common consent they became syringas. Now that would be all right if it did not happen that *Syringa* is the botanical name of the lilac, to which family the popularly named syringas bear no relation.

## HORSETAIL FAMILY

### *Equisetaceae*

The horsetail family embraces about 25 species grouped in a single genus, which includes the common horsetails and the scouring-rushes. They are of rather wide distribution. The scouring-rushes get their name from the fact that in country districts where they abound, they are used for scouring floors. Certain species are imported from Holland for use in polishing hardwoods and alabaster. The cell walls of the stems are filled with silica, which makes them excellent material for the manufacture of scouring and polishing brushes. The members of the horsetail family are native throughout North America, Europe, and Asia, and are found in wet places and along the banks of streams.

The horsetails are a remnant of an extensive group of plants which flourished in the coal-forming era of geological history, at which period they were a conspicuous part of the earth's flora. The structure of these early forms has been so perfectly preserved in the fossilized specimens that one can learn more readily from these fossils than from existing species the relationships of the group. Some of them grew in dense forests, attaining a height of from 60 to 90 feet and a girth of 3 feet.

## HORSETAIL

### *Equisetum arvense* L.

(See Page 146)

This is a representative species of the horsetail family. It flourishes in sandy soil, especially along roadsides and railways from Greenland to Alaska and southward to Virginia and California. It also is found in Europe. In Virginia it climbs the mountainsides to an elevation of 2,500 feet. Numerous aliases testify to its wide distribution. These include cornfield horsetail, bottlebrush, snake-pipes, and cats-tail. The flowering season of this best-known survivor of a great antediluvian race occurs in May.

## INDIANPIPE FAMILY

### *Monotropaceae*

The Indianpipe family consists of a group of humus-seeking or saprophytic plants, with about 12 species divided into 9 genera. The several species are found in most parts of the Northern Hemisphere, but mainly in North America. The family includes the giant bird's-nest or pinedrop, the sweet pinesap, and the false beech-drops. The Indianpipe, from which the family gets its name, has a wonderful set of aliases, such as ghost-flower, corpse-plant, convulsion-weed, bird's-nest, and fairy-smoke.

## RED PINESAP

### *Hypopitys insignata* Bicknell

(See Page 146)

The red pinesap has a wide range in the eastern United States and Canada, and flourishes especially in or near mountains, where it can find shelter and humus under fir, beech, and oak trees. Its flowering season is from June to October. By refusing to go out and dig in the soil for its own living, and by insisting on preying upon dead vegetation to get its nourishment, the pinesap has received the brand of the Cain of the vegetable world upon it. No plant that depends wholly on other plants, whether alive or dead, for its food, can wear the green livery of the respectable flower world. Chlorophyll refuses to form in their tissues and so they have to go up and down the earth wearing the badge of their depravity. The pinesap blossoms have a fringe of hairs radiating from their styles, and these form a stockade against insect pilferers.

## IRIS FAMILY

### *Iridaceae*

The iris family includes about 1,000 species grouped in some 60 genera. The family finds all lands to its liking except the polar regions, the cold there being too great and long-continued for the prosperity of the irises. Perennial herbs, found mostly in damp or moist situations, and possessing showy, bisexual flowers, the irises are favorites everywhere. Most American species have creeping and more or less tuberous rootstocks. The family is related closely to the lily and the amaryllis.

To the casual observer the irises appear to have nine petals of different sizes, but in reality there are three sepals, three petals, and three petal-like branches of the style.

The family includes the blueflags, the blue-eyed-grasses, and the irises.

## BLUEFLAG IRIS

### *Iris versicolor* L.

(See Page 147)

Among the stateliest and proudest of the members of America's flower family none excels the blueflag iris, which also wears the names of blue iris and fleur-de-lis. Ruskin calls it the flower of chivalry, which has a sword for its leaf and a lily for its heart. Longfellow pronounces it "a flower born in the purple, to joy and pleasure."

The blueflag iris seeks the wet, rich marsh and meadow, where it can find ample moisture for its rich nectar manufactories. It flowers from May to July, and lends its beauties to America from Newfoundland and Manitoba to Florida and Arkansas.

From the standpoint of the botanist, it has an especial interest because of the remarkable care it has taken to evolve a never-failing system of cross-fertilization and to avoid self-fertilization. The position of the stamens is such that it is next to impossible for their pollen to reach the stigmas of the same flower, for these stigmas are protected from the stamens by being borne in pockets on the inner surface of the petal-like, overarching styles.

Therefore the flag flower must look to the insect world entirely for its propagation, and to the bees in particular. So it puts forth a flower that is blue-tinted, for its experience has taught it that a bee can be wooed with blue better than with any





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FRINGED GENTIAN  
*Gentiana crinita* Froelich  
GENTIAN FAMILY  
(See Page 104)



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WILD GERANIUM  
*Geranium maculatum* L.  
GERANIUM FAMILY  
(See Page 105)

other color. Dressed in her beautiful gown of blue, the pretty flower maid proves irresistible to the passing bee, who turns aside to drink at her well, and is given her message of life to bear to some other waiting flower. The bee finds the recurving platform of the handsome sepal an ideal landing platform, and from this the dark veins and golden lines form the guideposts that point with unerring aim toward the nectar cup below.

The iris was long centuries ago adopted by Louis VII, the gallant young Crusader, as the emblem of his house. It became thereby "the flower of Louis," which was corrupted into "fleur-de-lis."

The blueflag iris is really meant when one speaks of the lily of France. The story runs that King Clovis, beaten on the battlefield as long as he had three black toads upon his shield, finally adopted the iris instead, upon the plea of Queen Clotilde, to whom it had been related by a holy hermit that an angel had brought him a shield containing three irises and shining as the sun. Clovis thereafter was successful on the battlefield. In later reigns the iris was thickly strewn upon the royal standards of France, but Charles V finally reduced them to three to typify the Holy Trinity.

The iris is a plant that insures its life. It has a big rootstock, which contains a powerful hepatic stimulant known as "iridin." In this rootstock it stores up endowment insurance in the days of plenty, so that when the earth is chill, cold, and inhospitable its savings will provide against need.

#### EASTERN BLUE-EYED-GRASS

*Sisyrinchium graminoides* Bicknell

(See Page 147)

The violet-blue eastern blue-eyed-grass, flowering in May and June and lending its beauty to the coastal region from Maine to Florida, is a charming member of the iris family. It is a tall, bending species, with a slender stalk sometimes two feet long, and has been called a little sister of the stately blueflag. Only on bright days do its flowers venture out and then only one at a time. On being gathered, this little "eye bright" of the fields promptly closes its eyes and refuses again to open them except under the persuasion of the sunshine itself. The flower of the blue-eyed-grass not only takes the sunshiny day to come out, but after that one day is past it closes its eye never again to open it.

#### BLACKBERRY-LILY

*Belamcanda chinensis* (L.) DC.

(See Page 150)

The blackberry-lily is an imported flower which, escaping from flower gardens, has been able to fight its own battles and settle down to an independent existence on hills and along roadsides from Connecticut to Georgia and westward to Kansas. Its flowering season occurs in June and July, and it gets its name from the appearance of its fruit, which ripens from July to September. In some quarters it is called the leopard-flower.

Like many another flower that is a lily to the layman, this one does not belong to the lily family at all, but rather to the iris family. It is truly an oriental, having come to the Occident from China.

### LAUREL FAMILY

*Lauraceae*

The laurel family of the botanists embraces a group of plants entirely different from those of which the layman thinks when one speaks of laurels. The layman thinks of the mountain-laurel, the lambkill and kindred species; but the botanist thinks of our friends the sassafras and the spicebush. The family consists of about 1,000 species which group themselves into about 40 genera. The species are widely distributed in tropical regions, only a few of them being hardy enough to venture into the domains of Jack Frost. They are practically all aromatic. Among those species which have ventured into our latitudes are the sweetbay, sometimes known as false mahogany, the swamp bay, the sassafras, the pond spice, and the spicebush. The aromatic qualities of the sassafras and the spicebush have made them figure in household medicine. In some rural districts the sassafras roots are gathered, the bark dried, and afterwards used to brew sassafras tea. Both the sassafras and the spicebush play host to the swallowtail butterflies and their caterpillars.

#### SPICEBUSH

*Benzoin aestivale* (L.) Nees

(See Page 150)

Dwelling in deep, damp woods from Maine and Ontario to Kansas and Carolina, the spicebush, with its dainty yellow flowers and its seductive odor, is a real harbinger of spring. Flowering from March to May, its blossoms arrive even before the pussy willow wakes up, and vie with the shadblow in the promptness of their advent. When they first appear, the flowers nestle close to the bare branches.

One species of the spicebush is found in abundance in eastern Asia. On account of the toughness of the wood and its aromatic fragrance, natives prize it for toothpicks. A new perfume, called Kuromoji, made from the essential oil of this plant, is now much in demand.

This shrub has several aliases—Benjamin-bush, wild allspice, and feverbush.

The spicebush played its rôle in the Revolutionary War. Allspice was kept out of the American market, and the women of the times used the powdered berries of this plant as a substitute. During the Civil War its leaves were used in making a brew that took the place of tea.

### LILY FAMILY

*Liliaceae*

The lily family consists of about 1,300 species, grouped into approximately 125 genera, of wide distribution. It includes the lilies, the leeks, the garlics, the onions, the fritillaries, the tulips, the adderstongue, the star-of-Bethlehems, the hyacinths, the yuccas, and the beargrasses. Some authorities make it embrace also the asparagus, the clintonias, the solomonseals, the disporums, the spikenards, the bellworts, the twistedstalks, the trilliums, the wakerobins, the asphodels, the devilsbits, the greenbriers, and the carrionflowers. But the Government botanists take away from it these latter plants and assign them to the lily-of-the-valley and smilax families. Britton and Brown go a step further and set up a fourth family which includes the trilliums and the wakerobins.



Among all races and in all ages the lily has been a favorite of man. In both tradition and in legend it has played its rôle. The tomb of the Virgin was filled with lilies to allay the doubts of the ever-doubting Thomas. The Greeks and Romans considered the lily a symbol of purity, and the Easter lily is the symbol of the Christian faith in the hope of a life beyond the grave.

Several species of the family yield valuable resins, others furnish a substitute for soap, and still others produce useful fibers. Some offer pharmaceutical materials.

### SEGO-LILY

*Calochortus nuttalli* T. & G.

Utah State Flower

(See Page 154)

Utah's floral queen, the sego-lily, belongs to the tulip branch of the lily family.

It is a variety of the mariposa tulip. Its flower is about two inches across, and its white petals are tinged sometimes with yellowish green and sometimes with lilac. The flowers usually follow individual taste in colorings and wear a wide range of the prettiest gowns imaginable.

Mariposa in Spanish means butterfly, and the members of the mariposa group of flowers, to which the sego-lily belongs, are marvelous in their hues and delightful in their imitations of the decorative patterns and color combinations of their insect friends.

A visitor to the big trees of the Mariposa Grove relates how she found a bed of sego-lilies in which, upon close examination, she discovered fourteen distinct markings, the flowers resembling so many butterflies with wings outspread for flight, their rich color glistening in the sun.

The sego-lily was even more to the early Mormon church in Utah than was the mayflower to the Pilgrims at Plymouth. The mayflower was the springtime's first harbinger and a blossom of hope; the sego-lily was not only early on the scene to gladden a somewhat dreary landscape, but its roots proved edible. The followers of Brigham Young looked upon it in somewhat the same light as the Jews looked upon the manna that saved them during their wanderings in the wilderness. Therefore the sego-lily has figured largely in the history of the Mormon Church in Utah and has been accorded the distinction of State flower as a memento of the early settlers' gratitude.

### TAWNY DAYLILY

*Hemerocallis fulva* L.

(See Page 151)

The tawny daylily is a native of Europe and Asia which crossed the seas at the bidding of flower-loving Americans, and became popular in the gardens of the East. But generations of coddling at the hands of horticulturists have not served entirely to breed out of it a desire and an ability to shift for itself, so we see it labeled an "escape" in the botanists' manuals. It has gained a foothold from New Brunswick to Virginia and Tennessee, where it flourishes in meadows and along streams, blossoming from June through August, and attaining a stem growth of three to six feet. It is known in some localities as Eve's-thread, and in others as the lemon daylily or lemonlily. It gets its botanical name from the Greek, which proclaims

that it is beautiful only for a day. Less attractive as a plant than its more pretentious sister *H. flava*, and odorless, it makes up in the beauty of its tawny flower what it lacks in plant symmetry and fragrance.

### CANADA LILY

*Lilium canadense* L.

(See Page 154)

The boundaries of the Canada lily's American domain reach from Nova Scotia on the north to Georgia on the south and the western half of the Mississippi Valley on the west. It flowers in June and July and most often is found in low meadows, although it thrives in swamps and fields to some extent.

With its pendulous, brown-dotted, buff-yellow blossom hanging so as to protect its nectar from the rain, the Canada lily is a favorite friend of the wild honeybee and the leaf-cutting bee, which visit the flower to gather its brown pollen as well as to sip its nectar.

When the Master, in His magnificent Sermon on the Mount, bade the world to "consider the lilies of the field," He did not refer to the lilies we know, but how well does His injunction fit; for what richer lessons can we gain from Nature than by studying the life, form, and behavior of the lilies that render such helpful aid in lending enchantment to the summer by their beautiful nodding bells, which seem to toll the hours of flower land! Less gorgeous, it is true, than its beautiful sister, the Turkscape, the Canada lily still justifies the inspired verdict that Solomon in all his glory was not arrayed as it. Some have called the bell-like flowers of this lily "fairy caps," while others have called them "witch caps." But whether it be the fairies or whether the witches that adorn themselves in such dainty headgear, we know that the bee often uses the flower for a "shelter in the time of storm." Some one has said that the form of the lily stock and flower suggest an exquisite design for a church candelabra.

### GRAYS LILY

*Lilium grayi* S. Wats.

(See Page 151)

Grays lily, a typical mountain flower, belongs to the southern Appalachians. It is a scentless member of the family and is closely related to the Canada lily.

Its flowers are somewhat smaller, its color tone is deeper, and its head more often nods. When cultivated it loses its differentiating characteristics and sooner or later shows more of the character of the Canada lily.

### AMERICAN TURKSCAPE LILY

*Lilium superbum* L.

(See Page 154)

*Lilium superbum* is the Latin name for that beautiful flower we call the Turkscape, and it deserves the name, for of all the "lilies of the field," it is tallest, stateliest, most prolific of bloom, most variable in form, color, and size. Its domain reaches from Maine to the Carolinas and westward to and including Tennessee and Minnesota. Like many other wild flowers, it loves to be petted by the horticulturist, and responds with wonderful alacrity to good treatment. Growing wild, from three to



WAX CURRANT  
*Ribes cereum Douglas*  
 GOOSEBERRY FAMILY  
 (See Page 108)



DWARF GINSENG  
*Panax trifolium L.*  
 GINSENG FAMILY  
 (See Page 105)

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LAMBS-QUARTERS  
*Chenopodium album* L.  
 GOOSEFOOT FAMILY  
 (See Page 108)



MOCK-CUCUMBER  
*Echinocystis lobata* T. & G.  
 GOURD FAMILY  
 (See Page 108)



seven flowers appear in a terminal group on the lily stock. Pampered by the horticulturist, it will crown itself with as many as 40 blossoms and grow to a height of 9 feet. July and August are the months when the Turkscap lily lends its flowers to the enrichment of the landscape.

### FIELD GARLIC

*Allium vineale* L.

(See Page 151)

Of all the undesirable aliens of the plant world that have obtained a foothold on American shores, none takes higher rank in undesirability than the field garlic. It came as a stowaway and has spread rapidly over the eastern part of the United States. It justifies the farmer's assertion that it "seeds at both ends," since it not only bears a whole umbel of seeds and bulblets on its onion-like stem, but a lot of tiny onions at the root. As it gives a garlic flavor to milk and butter it is particularly objectionable in pastures.

From the earliest times garlic, *Allium sativum*, has been a relish with a great many people and anathema to many others. It was eaten by the children of Israel during their stay in Egypt, and furnished to the laborers by Cheops while they were building the great pyramid that bears his name.

### LIZARDTAIL FAMILY

*Saururaceae*

The lizardtail family is one of the smallest in the botanical world, with only four species. Its members are perennial herbs which are native of North America and Asia. They frequent marsh lands and possess slender rootstocks.

#### COMMON LIZARDTAIL

*Saururus cernuus* L.

(See Page 150)

The lizardtail is an attractive flower. It possesses a fragrant odor and is found in shallow water and marshes from southern New England to Florida and westward to southern Ontario and Texas. It flowers from June to August, and has a slender stem. It is known also as the swamplily and the breast-weed.

Growing where bumblebees and butterflies are less numerous and where flies abound in great numbers, the lizardtail suppresses the showy petal and substitutes the fragrant odor as its main advertising feature, since the flies are guided by odor, whereas the bumblebees and butterflies are attracted more by color. Hence it is that the lizardtail's flowers are minute and massed, so that the buzzing flies may the more readily communicate the pollen from one to another.

### LILY-OF-THE-VALLEY FAMILY

*Convallariaceae*

This family, so closely related to the lily family as to be included therein by Gray and others, is made up of about 215 species, divided into 23 generic groups. It includes the familiar asparagus, the clintonias, the spikenards, the solomonseals, the disporums, the twistedstalks, the bellworts, the lily-of-the-valley, the trilliums, the wakerobins, and the cucumber-root.

The clintonias remind the initiated of the fact that one of the Republic's founders was a botanist

as well as an elder statesman. Thoreau complained against naming a flower after DeWitt Clinton, saying that he might mean a whole lot to New York, but certainly he didn't to Massachusetts. He added that if flowers are to be named after men at all they should be named after men of flowers. He had overlooked the fact that DeWitt Clinton was a botanist as well as a statesman, and studied flowers as our modern officials play golf—to get a brief respite from the cares of state through exercise in the open.

### PURPLE TRILLIUM

*Trillium erectum* L.

(See Page 155)

The purple trillium, inhabiting rich, moist woodlands, flourishes from Nova Scotia to North Carolina and westward to Manitoba and Missouri. Its flowering season is from April to June. Unfortunately its character does not measure up to its attractive name for it has chosen to cater to the flesh flies rather than to the butterflies and bees. Its flowers have come to look something like raw meat and their odor to approximate that of decaying flesh. Hence its vernacular name—ill-scented wakerobin. It does a land office business with the customers to which it caters, but one cannot help wondering why it turned away from the butterflies to the flesh flies.

The other trilliums are normal flowers, catering to the conventional flower patronage of bees and butterflies. One who has seen the woods literally carpeted with beautiful white trilliums or painted wakerobins, knows how much they can add to a wooded landscape. I have seen hundreds of acres of them in the mountains between Cumberland and Pittsburgh.

### LOBELIA FAMILY

*Lobeliaceae*

The lobelia family consists of about 600 species, divided into some 20 genera. The majority of the species, which are of wide distribution, are herbs, although some of the tropical members attain the dignity of shrubs or even trees. Many of them contain a milky sap, in which a narcotic poison occurs. This is especially abundant in *Lobelia inflata*, which accounts for its name, Indian-tobacco. The lobelias are not given family rank by the older authorities, but are put into the bellflower family, of which they are close relatives.

### CARDINALFLOWER

*Lobelia cardinalis* L.

(See Page 158)

Throughout the eastern United States and Canada and as far west as Kansas the cardinal-flower is one of the most striking of the country's wild flowers. It blossoms from July to September and its favorite haunts are wet, low grounds beside streams and ditches. It excels its namesake of birdhood in the richness of its colors.

The lobelia was named after Mathis de Lobel, a native of the French city of Lille, who was botanist and physician to James I. The plant has a certain pharmacological resemblance to tobacco. In large doses it is a powerful gastro-intestinal stimulant, causing giddiness, headache, nausea, and extreme prostration, with clammy sweats and irregular pulse.



VIRGINIA CREEPER  
*Ampelopsis quinquefolia* Michx.  
GRAPE FAMILY  
(See Page 108)



© N. G. S.

Magnified 30 Diameters

**BARNYARD GRASS**  
*Echinochloa crusgalli* (L.) Beauv.  
 GRASS FAMILY  
 (See Page 109)

The familiar barnyard grass is a strong-growing annual, one to four feet in height, having wide leaves. It grows in moist or well-manured soil. The flowers occur in a compound raceme, or cluster, of spikelets and have long and very rough awns (beards or bristly appendages). The feathery stigmas are crimson and showy. Flowers appear from August to October.





© N. G. S.

Magnified 50 Diameters

**TIMOTHY**  
*Phleum pratense L.*  
 GRASS FAMILY  
 (See Page 108)

Timothy is said to have derived its name from Timothy Hansen, of Maryland, who introduced it into the American Colonies from England in 1720. It is a native of Europe, but is now widely distributed throughout the world. It is the standard hay grass of temperate regions. The flowers are arranged in a dense spike about three or four inches long and containing several hundred flowers.



© N. G. S.

Magnified 50 Diameters

# KENTUCKY BLUEGRASS

*Poa pratensis* L.

GRASS FAMILY

(See Page 109)

Kentucky bluegrass is a meadow grass of high order and unequalled for pasturage. It is also a favorite lawn grass where the soil is fertile, there is plenty of moisture, and the sun is not too hot. It blooms in May and June and the flowers occur in a loose panicle, or tuft, of spikelets, each spikelet having three to six flowers.



PURPLETOP  
*Triodia flava* (L.) Hitchcock  
 GRASS FAMILY  
 (See Page 109)

Purpletop is a perennial growing to the height of three to five feet, with smooth, flat leaves. It is found in dry fields from southern New York, the Ohio Valley and Missouri southward. It is a very showy grass with large panicles of flowers which occur in 5- to 7-flowered spikelets. The glumes, or husks, are deep purple and shining, and the feathery stigmas almost brown, standing out in strong contrast against the bright green of the stem and foliage.





© N. G. S.

Magnified 50 Diameters

# PERENNIAL RYEGRASS

*Lolium perenne* L.

GRASS FAMILY

(See Page 109)

Ryegrass is a perennial with flowers occurring 8 to 15 in spikelets situated alternately on the rachis, or axis. It grows in fields and lots and is commonly considered a weed. Its blooming period is in June. Found mostly in the eastern part of the United States, it was introduced from Europe, where it occurs in numerous varieties.



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Magnified 54 Diameters

REDTOP  
*Agrostis palustris* Huds.  
 GRASS FAMILY  
 (See Page 109)

Redtop is a favorite perennial forage grass of the northern States, where it is much cultivated. Its flowers occur in a cone-shaped open panicle. The glumes are green and whitish or oftener with a reddish blush, which has given rise to the name "redtop."



© N. G. S.

Magnified 50 Diameters

**YELLOW FOXTAIL**  
*Chaetochloa lutescens* (Weigel) Stuntz  
 GRASS FAMILY  
 (See Page 109)

Yellow foxtail is a smallish plant commonly found in cultivated fields as a weed. The flowers grow in a dense cylindrical spike of a yellowish color. A cluster of bristles accompanies each floret, the coloring of which is delicate and beautiful. The perfect flower is transversely wrinkled, and surmounted by stigmas of a ciliate character (marginally fringed with hairs) beautifully colored. Pigeon grass is a name used in England for this plant.





© N. G. S.

Magnified 25 Diameters

ORCHARD GRASS  
*Dactylis glomerata* L.  
 GRASS FAMILY  
 (See Page 112)

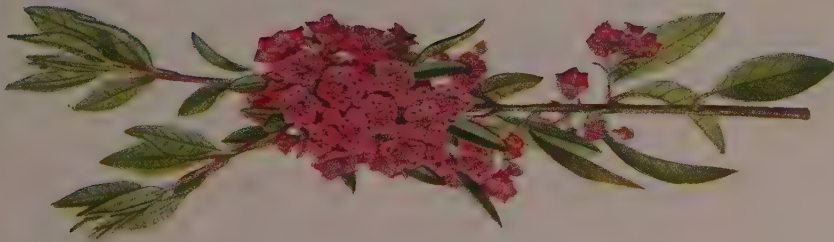
Orchard grass is a stout perennial growing in fields and yards, and attaining a height of three feet. The flowers occur in 3- and 4-flowered spikelets forming a dense, branching panicle. In early spring it affords good pasturage. Flowers appear in June, the flowering stem growing out of a dense tuft of broad leaves.



ROSEBAY RHODODENDRON  
*Rhododendron maximum* L.  
 HEATH FAMILY  
 West Virginia State Flower  
 (See Page 112)



COAST RHODODENDRON  
*Rhododendron californicum* Hooker  
 HEATH FAMILY  
 Washington State Flower  
 (See Page 112)



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**LAMBKILL**  
*Kalmia angustifolia* L.  
 HEATH FAMILY  
 (See Page 116)



**TRAILING-ARBUTUS**  
*Epigaea repens* L.  
 HEATH FAMILY  
 Massachusetts State Flower  
 (See Page 113)



**WINTERGREEN**  
*Gaultheria procumbens* L.  
 HEATH FAMILY  
 (See Page 113)





FLAME AZALEA  
*Azalea lutea* L.  
 HEATH FAMILY  
 (See Page 113)



MOUNTAIN-LAUREL  
*Kalmia latifolia* L.  
 HEATH FAMILY  
 Connecticut State Flower  
 (See Page 112)

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TRUMPET HONEYSUCKLE  
*Lonicera sempervirens* L.  
 HONEYSUCKLE FAMILY  
 (See Page 117)

AMERICAN HOLLY  
*Ilex opaca* Ait.  
 HOLLY FAMILY  
 (See Page 116)

COMMON WINTERBERRY  
*Ilex verticillata* (L.) A. Gray  
 HOLLY FAMILY  
 (See Page 116)



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AMERICAN CRANBERRYBUSH

*Viburnum americanum* Mill.

HONEYSUCKLE FAMILY

(See Page 117)

BLACKHAW (Middle and lower right)

*Viburnum prunifolium* L.

HONEYSUCKLE FAMILY

(See Page 120)

CORALBERRY (Upper right)

*Symphoricarpos orbiculatus* Moench

HONEYSUCKLE FAMILY

(See Page 120)



© N. G. S.

MAPLELEAF VIBURNUM  
*Viburnum acerifolium* L.  
HONEYSUCKLE FAMILY  
(See Page 120)



WITHE-ROD  
*Viburnum cassinoides* L.  
HONEYSUCKLE FAMILY  
(See Page 120)



SNOWBERRY  
*Symphoricarpos albus* (L.) Blake  
HONEYSUCKLE FAMILY  
(See Page 120)





LEWIS MOCKORANGE  
*Philadelphus lewisii* Pursh  
 HYDRANGEA FAMILY  
 Idaho State Flower  
 (See Page 120)



AMERICAN ELDER  
*Sambucus canadensis* L.  
 HONEYSUCKLE FAMILY  
 (See Page 117)

© N. G. S.

The closest friend of the cardinalflower is the humming-bird, and while the bees sometimes visit it they are never its most welcome guests.

We have a striking example in the lobelia of the tendency of plants to color themselves to delight the eyes of their favorite visitors. The shallow-cupped lobelia, which looks mostly to the blue-loving bees for carrying its pollen, is blue, while the deep-cupped lobelia, whose nectar can be sipped only by the red-loving, long-billed humming-bird, is red.

The humming-bird reminds one of Eugene Field, who, when asked what his favorite color was, replied: "Why I like any color at all so long as it is red!" Some botanists believe that scarcity of red flowers is due to the fact that there are so comparatively few humming-birds, and it is noted that red flowers are fewest where these birds are scarcest, showing again the particular community of interest between the flower and nectar-sipping creatures.

## LOGANIA FAMILY

### *Loganiaceae*

The logania family consists of herbs, shrubs, and, in some tropical genera, trees, widely distributed in warm and tropical regions. It consists of some 30 genera, embracing approximately 400 species. The genus *Gelsemium* has only one American species—the Carolina-jessamine. The only other species of this genus known occurs in Asia. Of the genus *Spigelia*, the pinkroot, known also as Indian pink, worm-grass, and star-bloom, is a representative species. Another member of the family is the mitrewort.

No family of plants is more strongly characterized by poisonous properties. Strychnine and nuxvomica both are products of species of logania.

## CAROLINA-JESSAMINE

*Gelsemium sempervirens* (L.) Ait. f.

South Carolina State Flower

(See Page 155)

When South Carolina joined the group of States whose legislatures are possessed of sufficient sentiment to select a flower for the national bouquet, she chose the Carolina-jessamine as her floral queen. As the sole American representative of the *Gelsemium* branch of the family, the Carolina-jessamine is admirably fitted for the rôle assigned, both as to name, fragrance, and appearance. It flourishes in woods and thickets from eastern Virginia to Florida and west and southward to Texas, Mexico and Guatemala. Its flowering season is from March to October, and among its incognitos are Carolina wild woodbine, and evening trumpetflower. Its stem is slender, trailing or climbing, and sometimes reaches a length of 20 feet.

## LOOSESTRIPE FAMILY

### *Lythraceae*

The loosestrife family consists of some 400 species grouped in about 20 genera. Most species are herbs, though there are numerous shrubs among them, and, in tropical regions a few species attain the stature of trees. Tropical America is the favored domain of the loosestrifes. The family embraces the ammannias, the water purslanes, the tooth-cups, the blue waxweeds, and the several loosestrifes.

## PURPLE LOOSESTRIFE

*Lythrum salicaria* L.

(See Page 158)

An immigrant from Europe, loving wet meadows, marshy places, and banks of streams, and flowering from June to August, the purple loosestrife has secured a foothold in North America and thrives from eastern Canada to Delaware and from the Atlantic seaboard to the Middle States. So beautiful is it that many are ready to forgive Europe for all the weeds it has sent us, when they see an inland marsh in August aglow with this beautiful flower born to the royal purple. The purple loosestrife is different from any other heretofore mentioned, because it has what are known as trimorphic flowers. Being unable to set seed without the aid of insects, the purple loosestrife has devised a most ingenious sort of arrangement to make sure that it shall not pass away until its flowers have been fertilized.

This plant produces six different kinds of yellow and green pollen on its two sets of three stamens; these six different kinds of pollen are deposited on the stigmas, which are of three different lengths. Darwin showed that only pollen brought from the shortest stamen to the shortest pistil and from the other stamens to the pistils of corresponding length could effectually fertilize the flower. He found that the reproductive organs, when of different length, behaved toward one another like different species of the same genus, both with regard to direct productiveness and in the character of the offspring. When he made his famous discovery concerning the trimorphism of the loosestrife, he wrote to Gray, the botanist: "I am almost stark, staring mad over *Lythrum*; . . . for the love of heaven have a look at some of your species, and if you can get me some seeds, do."

Dressed in such bright-hued clothing and secreting abundant supplies of nectar at the base of its flower tubes, it is natural that many insects should seek out the purple loosestrife. When visiting the flower, they alight on the stamens and pistils of the upper side first.

## MADDER FAMILY

### *Rubiaceae*

The madder family is one of the largest in the plant world, there being more than 6,000 species described to date. These are grouped into about 340 genera. There are herbs, shrubs, and trees included in the family, which embraces the coffee tree, the cinchona tree, the bluets, the houstonias, the buttonweeds, the bedstraws, the cleavers, the wild licorice, the goose-grasses, and the madders.

The family is essentially a tropical one, though enough of its members have passed the frost line to bring us some of our most attractive wild flowers.

Some members sustain a remarkable association with certain species of ants. In these the base of the stem forms a large tuber which is attached to the tree upon which the plants are epiphytic, by numerous adventitious roots. These tubers are shot through with galleries that are peculiarly lined with cork, as if they were designed especially for the ants. And the ants make the most of the hospitality, though it has not been ascertained what service they render the plants.



HORSETAIL  
*Equisetum arvense* L.  
HORSETAIL FAMILY



RED PINESAP  
*Hypopitys insignata* Bicknell  
INDIANPIPE FAMILY  
(See B. 200, 201)





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**EASTERN BLUE-EYED-GRASS**  
*Sisyrinchium graminoides* Bicknell  
IRIS FAMILY  
(See Page 124)

**BLUEFLAG IRIS**  
*Iris versicolor* L.  
IRIS FAMILY  
(See Page 121)

## COMMON BUTTONBUSH

*Cephalanthus occidentalis* L.

(See Page 159)

One of the first traits we notice about the buttonbush is its constant endeavor to keep away from mankind. Knowing that the swamp is about the safest place from human incursions that it can find, it goes there and dwells in enviable isolation.

We are prone to be selfish enough to think that the beauty and fragrance of flowers were created for our especial pleasure and edification; and yet a study of Nature's flower garden reveals the fact that some of the most fragrant of the blossoms of summer shed their sweetness and pour forth their beauty in precincts far removed from man's accustomed haunts.

One of these is the buttonbush. With an odor as seductive as that of jessamine, it could win its way into the hearts and homes of humanity if it desired to do so; but it has no inclinations in that direction, although, like the swamp rosemallow, when led captive it submits gracefully and grows even more attractive than before.

Its closely packed host of florets, hundreds in number, with their long styles and capitate stigmas, do not remain fresh long after plucking.

The flowering season of the buttonbush begins in June and ends with September, and its range is from New Brunswick to Cuba and California. It is a shrub, and grows to a height varying from 3 to 12 feet.

It relies more on its appeal to the nose than to the eye of the insect world, having discovered that many insects can smell further than they can see. Only a comparatively few flowers have learned this to as full an extent as the buttonbush. Naturalists say that in New York State, which has rather a wide range of plant species, borrowing both from the northern and southern flora, there are only about 30 really fragrant species to be found.

The result of this plant's fragrance is that, in spite of any lack of gorgeousness its flowers may show, it always has a liberal share of the nectar drinkers of the insect world. Every floret has its own individual honey well, and these are so deep that a short-tongued bee or butterfly never succeeds in drinking one dry. Butterflies come first among its visitors, and after them honeybees and bumblebees, though wasps and carpenter-bees also seek a chance cup of nectar now and then.

## BLUETS

*Houstonia caerulea* L.

(See Page 162)

The bluet lends its beauty to a geographical area including eastern Canada, and southern Georgia and Alabama, reaching as far west as Michigan. Moist meadows and the banks of streams form its favorite environment. Its flowering season includes late April and most of July, although a few come out even as late as the dog-days of August.

A long list of local pseudonyms proclaim how thoroughly this bluet has laid hold on the popular imagination. Some of these are quaker-ladies, Venuspride, innocence, angel-eyes, blue-eyed-babies, little washerwomen, and eyebrights.

The flowers appear in two varieties, some with a blue matching that of the cloudless sky and others with a white rivaling the ununsunned snow. Indeed, a field decked with the latter looks as though it had received a tiny blanket of powdery snow.

This little bluet puts forth two forms of flowers in structure as well as in color. In the one the stamens remain in the lower part of the corolla tube and the pistils are extruded. In the other the stigmas remain below and the stamens are extruded.

But the two kinds are not found in the same patch, for each produces after its own kind.

Many insects visit the bluets, but the small bees and the smaller butterflies are their most frequent guests. The common little meadow fritillary is always a busy little creature in its commerce with the bluets when they are in bloom.

## PARTRIDGEBERRY

*Mitchella repens* L.

(See Page 162)

Another of the truly "wild" flowers that asks man only to be let alone in the fastness of the forest is the partridgeberry or twinberry. Its flowering season is from April to June and it sometimes fills a return engagement in the autumn. Its range is from Nova Scotia to the Gulf of Mexico and from the Atlantic seaboard to Minnesota and Texas.

The flowers of the partridgeberry have a system of securing cross-fertilization differing somewhat from that of the purple loosestrife. It is known as dimorphism. There are two different kinds of flowers—the one has mature stamens and immature stigmas and the other has mature stigmas and immature stamens. By this process no flower can fertilize itself and must rely upon its insect benefactor to prevent it from disappearing from the world through lack of ability to mature its seeds. Short-tongued bees and flies cannot reach the flower's nectar because of the hairs inside the tube, but the larger bees and butterflies which suck the nectar from the flowers with the tall stamens receive pollen on the exact spot on their long tongues that will come into contact with the sticky stigmas of another flower.

The two flowers at the top of a branch grow united in such a way that they seem to be Siamese twins of flower land. It is from the fruit resulting from this union that the plant gets its name of twinberry. Experience is said to prove that when only one of the twin flowers is pollinized by insects fruit rarely sets as a result, but when both are pollinized a healthy seeded berry follows.

## MAGNOLIA FAMILY

*Magnoliaceae*

The magnolia family consists of trees and shrubs which spread over a large part of the earth. There are about 75 species, and these are grouped in about 10 genera. Included in the family are the umbrella-trees, the cucumbertrees, the sweetbays, and the tuliptrees. The northern species are deciduous, but the southern ones are usually evergreen. The wood of the magnolias is close-grained, generally soft and spongy, light and satiny. One Japanese species is used extensively in lacquer manufacture. The bark and fruit of a few species were formerly employed in the making of stimulating and tonic decoctions. As a rule magnolias thrive best in rather rich, fairly open, moist, sandy or peaty loams, though the sweetbay needs wet ground for its prosperity. Some of the magnolias are found in fossil forms as far back as the Tertiary and even the Cretaceous periods of geological history—a few of them in the polar regions, far beyond their present ranges.



## SOUTHERN MAGNOLIA

*Magnolia grandiflora* L.

Louisiana and Mississippi State Flower

(See Page 163)

When Louisiana's legislature and Mississippi's school children awarded the southern magnolia the high praise of being rated first among the flowers of their respective States and declared that it best typifies their ideals and expresses their aspirations, they selected a floral emblem widely known and universally admired, not less for its exquisite beauty than for its delightful fragrance. The Chinese regard the magnolia as symbolical of candor and beauty, and whoever has known the sweetness of its perfume and the charm of its blossom can appreciate the tribute.

There are many kinds of magnolias, each with its own peculiar attractions. But queen of them all is the *grandiflora*, which has borrowed all the beauties of the mountain-laurel and the rhododendron. It has a straight trunk, two feet in diameter, which often rises to a height of 70 feet. It is an evergreen, with leaves not unlike those of the laurel, glossy green on top, rusty brown beneath, and oval-oblong in shape. It bears a profusion of large, creamy white, lemon-scented flowers. As these latter reach their final stages before the petals fall, they turn a pale apricot hue. When fruiting time comes it is a cone of dangling scarlet seeds that we see. This magnolia is able to weather the winters in protected positions, as far north as Washington and a beautiful example of it may be seen in the grounds of the NATIONAL GEOGRAPHIC SOCIETY.

Several species of beetles are the special insect patrons of the magnolia. Abundant pollen and nectar in profusion suit them so well that instead of making a fleeting visit to a flower they shelter themselves in the soft petals and stay and stay until dispossessed by the fading of the blossom. Then only do they go to another field to pasture; but as they go they carry liberal quantities of pollen grains with which to reward their new host for the food and drink and shelter they seek and secure.

## TULIPTREE

*Liriodendron tulipifera* L.

Indiana State Flower

(See Page 163)

Indiana's legislature years ago declared the pink carnation the Hoosier State flower. But as the years went by our Hoosier friends had a change of heart and deposed the carnation as their floral queen, enthroning, instead, the tuliptree. Indiana seems to be the only State in the Union that has ever deposed a legally enthroned flower queen.

Various known as the lime-tree, blue-, white-, or yellow-poplar, lynntree, saddletree, basswood, hickory-poplar, tulip-poplar, saddle-leaf, and canoe-wood, the tuliptree has a range that reaches from Vermont to Florida and from Michigan to Arkansas and Mississippi, occurring mostly in woodlands and flowering in May and June. It is a magnificent tree frequently attaining a height of 190 feet.

## MALLOW FAMILY

*Malvaceae*

The mallow family embraces about 900 species of herbs and shrubs, which group themselves into

some 45 genera. It is widely distributed in tropical and temperate regions throughout both hemispheres. While for the most part the species all have perfect flowers, that is, with both stamens and pistils, there are some that bear staminate and pistillate flowers on the same plant, others that bear only the one or the other. A few species, however, bear all three kinds—perfect, staminate, and pistillate on a single plant, thus showing one of the striking stages of floral development. The mallows are mostly herbs with a mucilaginous juice and tough, fibrous bark. Their little fruits are commonly called "cheeses."

The hollyhock, the velvet-leaf, and the okra are mallows that do not bear the mallow name.

Many of the mallows are immigrants from Europe and Asia and, be it said, not one of them has proved to be an undesirable alien. Among those that have come to America are the marshmallow, the mucilaginous product of whose root is the original marshmallow of commerce; the cheeses, which get their name from the shape of their seed receptacles; the velvet-leaf, the high mallow, and the musk mallow.

There is one species of mallow whose existence in the United States is a matter of mystery. It is known as *Phymosia remota* and is found only on a gravelly island in the Kankakee River. Whether it is the sole survivor of a species brought out of its original geographic situation by glaciers coming down out of the North in remote ages, or whether it reached there by some other mysterious means, is not known. But whatever its origin, *P. remota* still persists and holds its little domain after all its comrades apparently have been blotted from the earth.

The mallows can point with pride to a long lineage of useful service to mankind. Even as far back as the days of Job, many wandering tribes cut up mallows and juniper roots for meat, and the Romans had a mallow which they served as a vegetable. The ancients considered the mallow a powerful medicinal herb; Pliny records this high regard by declaring that whoever eats a spoonful of mallows "shall that day be free from all diseases that come unto him."

## COMMON ROSEMALLOW

*Hibiscus moscheutos* L.

(See Page 166)

The common rosemallow is one of the largest and most gorgeous of all indigenous American flowering plants. Growing to a height of three to eight feet and having a flower from four to eight inches in diameter, it is a marked feature of any landscape it undertakes to adorn. Its flowering season is in August and September, and it occurs as far north as Massachusetts and as far south as the Gulf of Mexico.

It is one of that vast group of wild flowers that are truly wild, preferring to remain away from the haunts of man rather than to come out and force him to cultivate it by stealing a place among his crop plants. Rather, as if to be of service to humanity by adding its touch of beauty to spots that otherwise would be ugly, it seems to prefer brackish swamps, unkempt river banks, and unattractive stretches of lake shore.

But while it is one of the wild flowers, it submits readily to domestication and very peacefully takes its place in the flower garden alongside the hollyhock, which, by the way, is its distant cousin.



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SPICEBUSH  
*Benzoin actinale* (L.) Nees  
LAUREL FAMILY  
(See Page 124)

BLACKBERRY-LILY  
*Belamcanda chinensis* (L.) DC.  
IRIS FAMILY  
(See Page 124)

COMMON LIZARDTAIL  
*Saururus cernuus* L.  
LIZARDTAIL FAMILY  
(See Page 128)



GRAY'S LILY  
*Lilium grayi* S. Wats.  
 LILY FAMILY  
 (See Page 125)

FIELD GARLIC  
*Allium vineale* L.  
 LILY FAMILY  
 (See Page 128)

TAWNY DAYLILY  
*Heimerocallis fulva* L.  
 LILY FAMILY  
 (See Page 125)

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The mallow is a cousin of the cotton plant, the cotton fiber being nothing less than the woolly hairs with which that plant surrounds its seeds.

Many people confound the rosemallow with the marshmallow. It is indeed a marsh mallow, growing in marshy ground; but it is not *the* marshmallow. That mallow has a small, pink flower.

### CRIMSON-EYE ROSEMALLOW

*Hibiscus oculiroseus* Britton

(See Page 167)

One must go to the marshes along the coast of the eastern United States to meet the beautiful crimson-eye rosemallow, which flowers from July to September.

It is a cousin of the gorgeous common rosemallow, and is a native American plant, unlike the marshmallow, another cousin, which contributes so largely to the confectioner's art. Still another cousin is the okra plant, without which no southern vegetable garden is complete.

### CHECKERBLOOM

*Sidalcea malvaeflora* (Moc. & Sesse) A. Gray

(See Page 167)

The checkerbloom is a resident of the Pacific slope. California school children sometimes know it as the wild hollyhock. Its habitat is open fields in the valleys and on the plains; sometimes it climbs the hills, but loses size when it essays to live too high. The flowering season is from late April to early June, and the stems grow from eight inches to two feet in length.

### LOW POPPY-MALLOW

*Callirhoe involucrata* (T. & G.) A. Gray

(See Page 167)

The subject of this sketch is a midwestern flower whose range extends from Minnesota southward into northern Mexico. Its flowering season is from April to August. Growing in dry ground, it attains a height of one to two feet.

### MEADOWBEAUTY FAMILY

*Melastomataceae*

The meadowbeauty family is essentially a tropical one. It is high above the average in the number of species, there being some 3,000 recorded, grouped in some 175 genera. Widely distributed in the warm regions, there are only a few vigorous species that have been able to make sufficient terms with Jack Frost to enable them to survive the winters of our latitude. It is an interesting fact that all of the members of the family that have ventured beyond the frost line are members of a single genus—*Rhexia*.

### COMMON MEADOWBEAUTY

*Rhexia virginica* L.

(See Page 170)

A stout-stemmed perennial, which blossoms from July to September, over a range that reaches from Maine and Ontario to Florida and Louisiana, the common meadowbeauty is the best known member of its family in our latitude. It flourishes in sandy swamps, and its special insect customers seem to be the yellow butterfly and the honeybee. Possessed of the fine, fragile beauty that proclaims its tropical relationships, the meadowbeauty reminds one of the scarlet evening-primrose. A bright patch of these delicate, deep-hued flowers is always a delight

to the eye, and even when the flowers are gone, the scarlet leaves make a striking substitute for them. Thoreau, writing of the meadowbeauty says: "The scarlet leaves and stems of the *rhexia*, some time out of flower, make almost as bright a patch in the meadows now as the flowers did. Its seed-vessels are perfect little cream-pitchers of graceful form."

### MILKWEED FAMILY

*Asclepiadaceae*

The milkweed family consists of about 2,000 species, grouped in some 220 genera. The family is widely distributed over the face of the earth, but mainly in the Tropics and warmer temperate regions.

Most milkweed species have milky juices and many of them climbing habits. They differ both as to their characteristics and uses. Some are delightfully fragrant, while others are utterly evil-smelling. Some species yield fine fibers and others have medicinal properties.

The winged seeds of the various members of the family make them rivals of the thistles as colonizers. They were employers of lighter-than-air conveyances ages before Montgolfier dreamed of the balloon.

Many members of the family possess a marvelous mechanism for forcing their guests to pay well for their board.

The alighting place where insects effect their landings is decidedly smooth and slippery, and the arriving guest finds himself on a surface which makes a newly waxed ballroom floor seem like a stony pathway in comparison. As he does a combination of the tango, the fox trot, and the jig, trying to find a stable footing, one, or maybe two of his feet slip into a little slot, which holds fast. While wriggling around to get loose, his leg slips down farther into the slot. A sharp jerk releases the foot, if the insect is strong enough, but not until a little pair of pollen saddlebags have been bound to it. Bumblebees sometimes get away from a plant with half a dozen of these little saddlebags hanging to their legs.

### COMMON MILKWEED

*Asclepias syriaca* L.

(See Page 171)

One admires the common milkweed not for its beauty or its odor, but rather for its cunning. Its flowers lack brilliancy, and if one breaks the stem it exudes a sticky, milk-like juice with a sickening odor. But in its methods of insuring the perpetuation of the species it displays unusual ingenuity in making the insects its servants, and it has been able to girdle the warm and temperate zones of the earth.

Its blossoms are not fragrant to human beings, but they possess a wealth of nectar for bees, wasps, flies, beetles, and butterflies.

The common milkweed grows from three to five feet tall, flowers from June to September, prefers roadsides, fields, and waste places, and is found from the Atlantic coast to the Rocky Mountains and from New Brunswick to South Carolina.

### BUTTERFLYWEED

*Asclepias tuberosa* L.

(See Page 174)

This hardy American, like many another wild flower, has no taste for the solitude of woods and marshes. Rather, it prefers to add its touch of color to the roadside, the dry or sandy field, and

the hills. It loves to watch the world go by and to cheer the passing throng with its brilliant orange-red flowers, its green leaves, and red stalk.

Nor is the butterflyweed stingy with its favors, for June finds it decking itself with its splendid array of flowers; and only in September does it doff its gorgeous colors.

The butterflyweed sweeps in stately grandeur from Maine and Ontario to Arizona and the Gulf of Mexico.

Weed it may be to us, but sweetest inhabitant of Nature's flower garden it is to the myriads of butterflies, for whom it is indeed a "land flowing with milk and honey." The high and the low, the rich and the poor, the great and the small—prince, noble, and pauper alike—come to its table. Here is the exquisite half-moon-winged swallow-tail, touching elbows, as it were, with the scrubby little cabbage-butterfly, and the elegantly attired spice-bush swallow-tail sipping from a cup next to the one which the little, old, mud puddle "yaller" butterfly is draining.

At the Centennial Exposition at Philadelphia in 1876, a bed of beautiful flowers brought over from Holland won the admiration of many thousands of people and yet they were only a Dutch edition of our own butterflyweed.

The Indians used the butterflyweed's root in treating pleurisy, and made a crude sugar from its flowers. They used the young seed pods in the cooking of buffalo meat much as we might use green peppers with chicken or hash.

#### FOURLEAF MILKWEED

*Asclepias quadrifolia* Jacq.

(See Page 171)

This member of the milkweed family puts forth its blossoms in May, June, and July. Its range is from Maine and Ontario on the north to Alabama and Arkansas on the south. It occurs in woods and thickets usually. When one comes to examine the blossom with a magnifying glass he will perceive that the row of bodies which may casually be taken for stamens are in reality tubular bodies colored like petals, containing a curved, needle-like hook. The little tubes serve as hoods for the tiny hooks. Remove both the hoods and their hooks and the stamens will be revealed united into a tube standing around the pistil. The pollen in the anthers terminating the several stamens, instead of being in the form of grains, is in a long, flat, yellow mass. Two of these masses from adjacent anthers cling together by a little filament and constitute the saddlebags spoken of in the account of the family.

#### BLACK SWALLOW-WORT

*Cynanchum nigrum* (L.) Pers.

(See Page 171)

The black swallow-wort is a garden plant introduced from Europe which has made its escape from formal society and established itself in various sections of North America as remote from one another as Massachusetts, British Columbia, Pennsylvania, and Ohio. It prefers waste places and blooms from June to September.

#### MINT FAMILY

*Menthaceae*

Consisting of some 3,200 species grouped in about 160 genera, the mint family is of nearly universal distribution in the tropical and temperate

latitudes of the earth. The aromatic qualities of its members prove a tie that binds the many species together. Usually herbs, some species develop into shrubs, while a few have attained to the stature of trees. The foliage of all species, whether herb, shrub, or tree, abounds in volatile oils.

Included in the mint family are the bugles, the germanders or woodsages, the pennyroyals, both true and false, the bluecurls, the skullcaps, the hoarhounds, the iron-worts, the hyssops, the catnips, the ground-ivy, the selfheals, the dragon-heads, the lion's hearts, the motherworts, the deadnettles, the hedge nettles, the betonies, the sages, the balms, the bergamots, the blephiliads, the thymes, the mountain-mints, the mints, the citronella horsebalm, and the beefsteak plant.

The foliage of most mint species is dotted with small glands exuding a volatile oil, upon which depends the warmth and aroma characteristic of the several species.

Many of the housekeeper's and druggist's best flavorings—lavender, thyme, sage, marjoram, rosemary, hoarhound, peppermint, etc., are derived from members of this family. Whether the concoctions that have superseded the old-fashioned, simple herb drinks are more conducive to health or not, only vital statistics could show, and they are silent on the subject.

Some members of the family have been so thoroughly domesticated that they grow well under cultivation, though they levy such a heavy tax upon the land that a crop rotation is required, with only one crop of mint every five years. In reclaimed swamp land they are sometimes allowed to grow for five years without change. The mint is mown like clover and cured like hay. The oil is usually extracted by passing live steam through the mass of cured material; this steam carries the essential oil with it, and on being condensed, the oil and water separate, after which the mint crystals form in the oil.

#### PURPLE WILDBERGAMOT

*Monarda media* Willd.

(See Page 175)

The purple wildbergamot, like the hyssop skullcap, is a member of the mint family. It is a variety, according to some authorities, of the species *Monarda fistulosa*, and grows in most thickets from the Appalachian Mountains west to Minnesota.

The *Monardas* are particularly adapted to the entertainment of the butterflies, though bumblebees also frequent them and sometimes hive bees are their guests. The two stamens and the two-parted pistils are so situated that no visitor whose tongue is long enough to sip the blossom's nectar can avoid a pollen-dusting from the former or escape paying a pollen toll to the latter.

#### HAIRY WILDBERGAMOT

*Monarda mollis* L.

(See Page 175)

The hairy or pale wildbergamot is one of those flowers that has found hospitable environment in many places, having reached British Columbia in Canada and Texas in the United States. Its favorite habitat is in dry soil areas. The magenta shade of its blossom makes it popular with the butterflies; the ruby-throated humming-bird is also a visitor.

The bergamot mints are useful in the manufacture of perfumery, the essential oil being highly



CANADA LILY  
*Lilium canadense* L.  
LILY FAMILY  
(See Page 125)



SEGO LILY  
*Calochortus nuttalli* T. & G.  
LILY FAMILY  
Utah State Flower  
(See Page 125)



AMERICAN TURKSCAP LILY  
*Lilium superbum* L.  
LILY FAMILY  
(See Page 125)





PURPLE TRILLIUM  
*Trillium erectum* L.  
LILY-OF-THE-VALLEY FAMILY  
(See Page 128)



CAROLINA-JESSAMINE  
*Gelsemium sempervirens* (L.) Ait. f.  
LOGANIA FAMILY  
South Carolina State Flower  
(See Page 145)

aromatic. The hairy wildbergamot has many more or less distant cousins, among the closest being the beebalms. Spearmint, peppermint, mountain-mint, and catnip are cousins a little further removed.

### GROUND-IVY

*Glechoma hederacea* L.

(See Page 175)

This little immigrant from Europe has shown itself to be a great colonizer, and has established itself as far north as Newfoundland and Ontario, as far west as Oregon, and as far south as Georgia. It has a vast array of vernacular names, among them, alehoof, cat's-foot, gill, gill-ale, gill-over-the-ground, gill-go-by-the-ground, hayhofs, haymaids, tunhoof, creeping-Charlie, robin-run-away, crow-victuals, etc.

Its "gill" names are a survival of its European antecedents. There, its leaves were long used in the processes of fermenting and clarifying beer. The name is said to originate from the old French word *guiller*—to ferment or make merry.

The ground-ivy's preferred habitat is shady waste places, and its flowering season runs from early March to June. Grazing stock dislike its taste.

### HYSSOP SKULLCAP

*Scutellaria integrifolia* L.

(See Page 175)

Blooming from May to August over a range that reaches from southern New England to eastern Texas, this species of skullcap seldom grows taller than two feet, with the result that its fine colors are often hidden by surrounding vegetation. The leaves, like the stem, are covered with fine down. Its bright blue flowers are about an inch long.

The skullcaps have a helmet-like appendage on the upper lip of the calyx, and the imaginative Linnaeus saw in it a *scutellum* or little dish. Pushing this open, one discloses the four tiny seeds attached to the base. When the seeds begin to form, this helmet-like appendage enlarges and meets the lower lip, thus providing a hood for their protection. Once the plant dries, the mouth gapes and the seeds fall out or else the lower lip falls away and liberates them.

### MILKWORT FAMILY

*Polygalaceae*

About 1,000 species of plants compose the milkwort family, and these are grouped in 10 genera. Their distribution is a wide one through most of the tropical and temperate regions of the earth. Most species take the form of herbs, while a few are shrubs of considerable size.

In our latitude we have only one genus among the familiar flowers—*Polygala*. In addition to the orange and fringed polygalas pictured in this series, others that will come to the flower lover's attention are the pine-barren polygala, the cross-leaved polygala, the whorled polygala, the loosespiked polygala, the pink polygala, the field polygala, Curtiss' polygala, Nuttall's polygala, and the Seneca snakeroot.

Some of the milkwort species have two sets of flowers, "one for beauty and one for use, one playful for the world and one serious for posterity."

In truth, however, such milkworts, afraid that their fine flowers may fail to set seed, because the rains keep the bees indoors, or some other catas-

trophe occurs, have another set, much less showy, whose development was arrested in the bud. Without petals, nectaries, or fragrance, the stamens of these inconspicuous flowers are small, their pistils immature, and they have nothing to offer the bee. But if their showy sisters fail to perpetuate the family, they step in, self-fertilized, and save it from extinction.

### FRINGED POLYGALA

*Polygala paucifolia* Willd.

(See Page 177)

The fringed polygala dwells in moist, rich woods throughout a range whose northern limits include New Brunswick and Saskatchewan and whose southern boundary includes Georgia. It gets as far west as Minnesota. Flowering wintergreen, gay-wings, baby's-toes, little pollom, and bird-on-the-wing are some of its vernacular names. Its flowering season begins in May and usually ends in July.

When a bumblebee alights on the lower petal of the fringed polygala her weight so depresses the tubular petals that protect the stamens and pistil from rain, dew, and useless insects, that the spoon-tipped pistil is forced out. It pushes the pollen deposited by the anthers outward and onto the breast of the bee. The stigmatic surface of the pistil is on the opposite side of the spoon from that which comes into contact with the pollen of the flower's own anthers. Then as the bumblebee inserts her tongue into the nectar jar, some of the pollen from a previously visited flower adheres to the sticky surface of the pistil.

### ORANGE POLYGALA

*Polygala lutea* L.

(See Page 177)

Rejoicing in its bucolic name of wild bachelor's button, the orange polygala has clover-like heads closely packed with small florets. The plant grows from 6 to 12 inches tall and has a flowering season from June to October. It is equally at home in the swamps of Long Island, the pine barrens of New Jersey, the coasts of Florida, and the lowlands of Louisiana.

### MIMOSA FAMILY

*Mimosaceae*

Embracing the acacias, the silktree, the mimosas, the mesquites, and the sensitive-briers, the mimosa family is a tropical one consisting of some 1,500 species grouped in about 40 genera. Only a few species have proved themselves hardy enough to venture above the line of snowfall. While mostly herbs, there are quite a few shrubs and some trees included in the family. All are characterized by their fern-like leaves.

Like the sensitiveplants of the pea family, to which they are assigned by some authorities, the mimosas are able to check the excessive loss of water on hot, dry days by the folding of their leaves. As soon as the loss of water reaches the stage where it is detrimental to the plant, the leaves begin to fold until enough are closed to secure an equilibrium, and do not open again until the roots have absorbed enough water to satisfy all the plant's needs. The mimosas, like the members of the pea family, are leguminous plants. Such plants are able to obtain free nitrogen from the

air by means of tubercles or wart-like excrescences on their roots. These tubercles offer fine habitation for forms of nitrogen-fixing bacteria that have gained entrance thereto through the root hairs. Once ensconced therein, they give the plants nitrogen in exchange for carbohydrate food, thus establishing one of the finest cases of symbiosis—or you-tickle-me-and-I'll-tickle-you—known to biology.

Largely owing to this symbiotic relation, the legumes have long had high favor as green manures, but the explanation therefor did not appear until two or three decades ago, when Hellriegel and others not only proved the relationship, but also proved that poor soils may be inoculated with bacteria and thereby made suitable for the growing of legume crops.

### SENSITIVEPLANT

*Mimosa pudica* L.

(See Page 178)

The sensitiveplant of our hothouses and Gulf States is a native of tropical America, but has been naturalized in corresponding latitudes in Asia and Africa. Shelly's famous poem "The Sensitive Plant" refers to this species of *Mimosa*. Its wide cultivation is due partly to the beauty of its bipinnate foliage, but mainly to its sleepy movements and response to mechanical irritation. Light and darkness will cause it to wake or sleep; but even when touched the leaves will begin to assume an air of innocence and fold up. Shake the plant and not only do the leaves fold themselves but droop as well. But if the shaking be continued they seem to recover from the shock and grow accustomed to the shaking, opening again and paying no further attention to the proceedings.

### MISTLETOE FAMILY

*Loranthaceae*

The mistletoe family is composed of parasitic, green herbs and shrubs, containing chlorophyll, which grow on woody plants and absorb the latter's sap through specialized roots. The family possesses some 500 species, which are divided, according to their characteristics, into about 20 genera. While widely distributed, the mistletoes are mainly tropical in their climatic preferences.

The ability of the mistletoes to remain green, in spite of their parasitic habits, is due to the fact that they extract only the cruder materials from their hosts, and must be able to do a little food manufacturing on their own account. Generally parasitic plants are denied the right to wear the green habiliments of respectability.

The seeds of the mistletoes are usually, if not always, covered with a sort of mucilaginous material that causes them to adhere to the branches of trees when birds carry them there.

### AMERICAN MISTLETOE

*Phoradendron flavescens* (Pursh) Nutt.

'Oklahoma State Flower

(See Page 178)

The mistletoe is the only one of the State flowers so far adopted that is parasitic in its habits. And yet, parasite or no parasite, there is no blossom in the catalogue that has more of romance clinging to it than this, Oklahoma's representative in the galaxy of emblematic flowers.

Mistletoe figured in the superstitious rites of the British Druids and in the Nature myths of the

Scandinavians. Balder, son of Odin, husband of Nanna, and the darling of all the gods, was so fair that light streamed from him and the whitest flower that blew was likened to him. Once he had a dream of an impending disaster, which caused his mother to put all things, animate and inanimate, under a vow not to harm him. But she omitted one object—the mistletoe. Loki, his enemy, discovered this omission and induced Balder's brother to shoot at him in play with an arrow of mistletoe. It hit the mark and Balder, God of Light, died, becoming thereafter the emblem of purity and innocence.

The mistletoe was then presented to the Goddess of Love, and it was ordained that whoever passed beneath it should receive a kiss as a token that it was an emblem of love and not of vengeance. The modern Yuletide custom—perhaps more talked about than observed—of kissing the pretty girl under the mistletoe is a survival of those days.

If you ask the Oklahoman about the mistletoe as a parasite, he is likely to answer that if man, tapping the maple for sugar, extracting the sap of the rubber tree for automobile tires, and taking the pine tree's turpentine, is a parasite, then the mistletoe may be called one, too; but that otherwise it deserves to be absolved. It has as much right to get its food from trees, he maintains, as we have to eat beef and mutton or wear woolen clothes or silks and satins.

Of all plants the mistletoe has fewest breathing pores in its leaves—only 200 to the square inch, while the lilac has 200,000. The leaves are almost nerveless, thick, and fleshy. When the seeds put out roots, they always turn toward the branch, no matter whether on the upper or the lower side of it.

Traveling through the South, one may see thousands of trees literally festooned with mistletoe, now growing like witches' brooms, now in graceful array, but always calmly appropriating for its own development the lifeblood of the tree upon which it feeds.

### MOONSEED FAMILY

*Menispermaceae*

The moonseed family is essentially a tropical one, only a comparatively few species venturing into Canadian and our latitudes. It consists of about 150 species, divided into upward of 50 genera, thus having an average of only three species to a genus. The moonseeds are climbing or twining, woody or herbaceous vines.

The cup-seed found in rich woods from Illinois and Kansas to Florida and Texas; the snailseed or Carolina moonseed occurring along streams from Virginia and Kansas to Florida and Texas; and the common moonseed, living along streams from Quebec to Manitoba and from Georgia to Arkansas, are the principal species which have invaded temperate latitudes.

### COMMON MOONSEED

*Menispermum canadense* L.

(See Page 180)

Blooming in June and July and maturing its fruit in September, the common moonseed is a climbing vine that ranges from western Quebec and Manitoba to Georgia and Arkansas. It bears bunches of bluish black berries which resemble small grapes. Most flowering plants have blossoms





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CARDINALFLOWER  
*Lobelia cardinalis* L.  
LOBELIA FAMILY  
(See Page 128)



PURPLE LOOSESTRIFE  
*Lythrum salicaria* L.  
LOOSESTRIFE FAMILY  
(See Page 145)



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COMMON BUTTONBUSH  
*Cephalanthus occidentalis* L.  
MADDER FAMILY  
(See Page 148)

with pistils and stamens in the same flower. But the common moonseed has flowers that are pistillate and others that are staminate, and bears them on different plants, so that with representatives of this species there are not only distinctly male and female flowers, but even male and female plants.

This flower is a rank grower and climbs over thickets along the stream banks which constitute its habitat, often strangling other vegetation by its persistent effort to monopolize the sunlight in its vicinity.

A common name of this species of moonseed is yellow sarsaparilla.

## MORNING-GLORY FAMILY

### *Convolvulaceae*

The morning-glory family consists of about 1,000 species. These are grouped into about 45 genera, mostly tropical. Mainly herbs with trailing or climbing vines, there are some trees and numerous shrubs embraced in the family. Jalap and scammony come from two species while another yields the oil of rhodium and still another a woody powder used in some places either as incense or snuff.

In our latitude the family embraces the brewerias, the morning-glories, the bindweeds, and the sweet-potato. The sweetpotato belongs to the same genus as our common morning-glory, and the tuber represents the savings put away by the vine for its posterity. The germ of life is planted in a remarkable supply of starch, the essential food of the new vine when it first begins to sprout.

## HEDGE BINDWEED

### *Convolvulus sepium* L.

(See Page 179)

A hobo among flowers is the hedge bindweed. It has traveled up and down the lanes of world trade for centuries, until it has come to claim most of the Northern Hemisphere for its abiding place.

It is one of America's most bothersome weeds, as any farmer's son can bear witness who has operated a harrow or a grain drill when preparing corn ground for wheat sowing in the fall.

It loves wayside hedges and thickets, where it climbs over everything in its fight for the survival of the fittest; but it simply rejoices when it gets into a cornfield and can utilize the tall stalks of corn as a Nature-built trellis. In our own country it has found the Rocky Mountains a barrier, and for the time being has been arrested there, on its broad sweep around the northern world.

The flowering season of the hedge bindweed is the June-September period. A close relative of the fair morning-glory, its flowers are shaped like those of that charming summer visitor and behave something like them. It is a rather early riser, and lives out the doctrine that "early to bed and early to rise" produces health, wealth, and wisdom; for it goes to bed when the sun goes down, except on moonlight nights, when it keeps open house for the benefit of certain moths that are its especial friends.

A curious thing about the hedge bindweed is the fact that it cannot maintain itself, hardy and self-reliant as it is, where its special insect friends do not dwell. In Europe a certain moth flourishes in some districts, is rare in others, and entirely absent in still others. Wherever the moth is numerous the bindweed is everywhere; where it is

scarce the bindweed is an occasional visitor only; but where it does not dwell at all the bindweed never comes. Without the aid of that moth it is unable to set seed and therefore unable to propagate itself.

The hedge bindweed is an exceedingly rapid climber. The twining stems often describe a complete circle in less than two hours, turning always in the direction opposite to that of the hands on the face of a watch. A transverse section of the flower of the bindweed, cut to show the passages leading into the nectar chamber, makes it look like the cylinder of a "five-shooter" revolver.

## FIELD BINDWEED

### *Convolvulus arvensis* L.

(See Page 180)

Fields and waste places from Nova Scotia to New Jersey and thence across the United States to California are the favorite haunts of the field bindweed. It seems to have originally come out of Asia, moving thence to western Europe, and then "beating its way" across the Atlantic in earth ballast or in packing grass. Among its aliases are the following, hedge-bells, bearbind, corn-lily, withwind, bellbine, corn-bind, sheep-bine, and lap-love.

The flowering season begins in May and ends in September, and the small white or pink-tinged flowers are fragrant. The stigmas and anthers mature at the same time, but self-fertilization is prevented by having the pistils longer than the anthers, the former receiving pollen from a flower previously visited by the insect guest.

The bindweeds, both great and small, are a great nuisance to the farmer.

## MUSTARD FAMILY

### *Brassicaceae*

The mustard family consists of some 1,800 species of herbs, a few somewhat woody, of wide geographic distribution. These species are grouped into about 200 genera. Its members may be recognized by their alternate leaves, their biting juices, and the characteristic structure of their white, yellow, or purplish flowers. The petals are placed opposite each other in pairs, their spreading blades forming a cross, hence the name sometimes applied to the family, *Cruciferae*. They usually have six stamens, two of which are inserted lower down than the others. The pistil becomes a pod when the seeds are formed. The family includes the whitlow-grasses, the alyssums, the bladder-pods, the false flaxes, the shepherd's-purses, the awlwards, the cresses, the radishes and horseradishes, the pepper-grasses, the rockets, the turnips, the satin-pods, the toothworts, the sickle-pods, the rose-of-Jericho, the wallflowers, the candytufts, the stocks, and the honesties. Cabbage, kale, cauliflower, broccoli, kohlrabi, brussels sprouts, and rutabaga have all been evolved from a simple mustard plant living on the English coast.

## CHARLOCK

### *Brassica arvensis* (L.) Ktze.

(See Page 180)

Charlock or field mustard is one of the undesirable aliens of the plant world that succeeded in passing the Ellis Island of American commerce and securing a foothold in this country for its



pestiferous progeny. Exactly when it landed is not known, but it has spread throughout the grain-growing regions east of the Rocky Mountains.

This weed goes on its domineering way in spite of innumerable battles the careful farmer fights to repel its invasion. What farmer's son, too young to do the heavier work that farm operations demand, has not been detailed to go into the fields, armed with a hoe, to give battle to this invader so tenacious of life and of its "squatter sovereignty," and what wonder that a broiling sun, a big field, and this numerous foe have often caused a boy to lose interest in farm life and sent him on his way to the crowded city!

The charlock blossoms in late summer. The brilliant *Syrphidae* flies and honeybee, both having a fondness for yellow blossoms, come in great numbers and serve as pollen bearers. The stamens mature before the pistils.

## NETTLE FAMILY

### *Urticaceae*

The nettle family, according to the National Herbarium, includes the hemp, the hop, the several nettles, the richweed or clearweed, and the pellitory. Some authorities associate with it the elms, the hackberries, the mulberries, the osage-oranges, the India rubber trees, and the banyans.

Omitting these, the family consists of about 550 species divided into about 40 genera.

## COMMON HOP

### *Humulus lupulus* L.

(See Page 181)

The common hop grows wild in thickets and on river banks from Nova Scotia and Manitoba to Georgia and New Mexico. It is an escape from cultivation. The flowering season occurs in July and August and its seeds are ripe in September and October. The plants bear only male or female flowers. In American and English hop gardens it is customary to grow a sprinkling of male plants but in Continental gardens they are rigidly excluded. As the seeds are useless to the brewer, the main user of hops, the Continental practice meets his needs best. The only advantage of having the plants set seed is that the hops are made heavier thereby. Their presence makes the hops grade lower and therefore command a lower price, so that the net result is a loss to the grower. The ovary and the base of the bracts are covered with a yellow powder, called hop meal, which contains the active principle of the plant.

The hop has been grown so long from cuttings that it has lost its ability to come true from seed, and such seeds as it does produce when male plants are grown are usually incapable of reproducing the plant. The cuttings are made from the underground stems. Varieties imported from Bohemia produce no male plants and it is said that they yield more hop meal than the varieties from which the male of the species have not been entirely eliminated.

The enactment of national prohibition has been a blow to hop culture in the United States. In 1913 this country produced 62,000,000 pounds of hops out of a total of 173,000,000 pounds for the whole world—or nearly 40 per cent of the world's crop.

## NIGHTSHADE FAMILY

### *Solanaceae*

The nightshade family consists of herbs, shrubs, vines, and in some tropical species, even trees. It embraces some 1,750 species grouped in approximately 75 genera, and, while having a wide distribution, is most abundant in the Tropics.

The family includes the familiar Irish potato that should be known as the Peruvian potato, for it came to civilization from that country; the tomato, the eggplant, the apple-of-Peru, the groundcherry, the nightshade, the sand brier, the thorn apple, the Jimson-weed, the tobacco, and the petunia. The latter came to us from Brazil and in their wild state are escapes from cultivation.

Occasionally the tomato and the potato have sought to establish themselves as a result of the abandonment of gardens, but they have found the battle for existence too strenuous for their strength. Coddled through so many generations by gardeners, they have entirely lost their ability to make their own way through the world.

## BITTER NIGHTSHADE

### *Solanum dulcamara* L.

(See Page 182)

Like the bindweed, the bitter nightshade has almost girdled the globe in the Northern Hemisphere. In the United States it has colonized the northern part of the country as far westward as Kansas. It is also found in Canada and came to us as a plant immigrant from Europe. That the berries were poisonous, even to the touch, used to be asserted. Thoreau declared "they hang more gracefully from the river's brim than any pendant in a lady's ear, yet they are considered poisonous; but not to look at, surely. . . . But why should they not be poisonous? Would it not be bad taste to eat these berries which are ready to feed another sense?" The bitter nightshade loves the moist thicket and fence row and flowers from May to September. Possessed of no nectar with which to attract the insects, the purple flowers of the nightshade are wallflowers in the carnivals of floral beauty, and they get few visits from the gallants of the insect world.

## CLAMMY GROUNDCHERRY

### *Physalis heterophylla* Nees.

(See Page 181)

The clammy groundcherry, in its prime, is an upstanding herb, but late in the season sprawls. It usually grows from one to three feet high and claims most of North America east of the Rockies as its range, but requires rich soil.

## OLIVE FAMILY

### *Oleaceae*

This family consists of trees, shrubs, and a few herbs of wide distribution in tropical and temperate lands. It embraces upward of 500 species, grouped in about 20 genera. In addition to the lilac it includes the true ash, the fringetree, the privet, and the cultivated olive tree. At what remote period in the world's history the olive first came under cultivation is not known. We only know that among the earliest records of the race the gift of an olive tree was a symbol of peace and good will, and that traffic in olive oil was one of the forerunners of modern commerce. In Homer's time olive oil was a luxury of the wealthy, and the warriors anointed themselves with it after their baths.



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PARTRIDGEBERRY (Upper)  
*Mitchella repens* L.  
 Madder Family  
 (See Page 148)

BLUETS (Lower)  
*Houstonia caerulea* L.  
 Madder Family  
 (See Page 148)



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TULIPTREE (Upper)  
*Liriodendron tulipifera* L.  
MAGNOLIA FAMILY  
Indiana State Flower  
(See Page 149)



SOUTHERN MAGNOLIA (Lower)  
*Magnolia grandiflora* L.  
MAGNOLIA FAMILY  
Louisiana and Mississippi State Flower  
(See Page 149)



## COMMON LILAC

*Syringa vulgaris* L.

New Hampshire State Flower

(See Page 182)

New Hampshire is one of the recent States to elect a flower to queenship by legislative act, and everybody will applaud the State's choice of the common or purple lilac to represent it in the national family of royal flowers. It is an escape from gardens to roadsides, and its range is from Maine to Virginia and westward. A native of eastern Europe, it was long ago brought to America by our flower-loving ancestors, and is supposed to have been taken to Vienna from Persia in the 16th century.

The several species of lilac cultivated in America usually have purplish or white flowers, and are valued for park and garden planting because of their hardiness and free-blooming qualities. The wood of larger specimens is prized by cabinetmakers for turning and inlaying. The lilacs thrive best in deep, rich soil, but are able to succeed almost anywhere. They have a habit of growing suckers, of which advantage is taken in propagating. They may also be propagated by cuttings and by grafting on privet.

## ORCHIS FAMILY

*Orchidaceae*

The orchis family is one of the most successful in the entire plant world. It is a true cosmopolitan and includes some 5,000 species in its household. These are grouped in about 430 genera.

To many a lay mind an orchid suggests a tropical air plant of exotic beauty or unusual structure. This probably is due to the fact that in the conventional orchid show only exotic species are put on exhibition.

But there are many species that are native and command only passing attention from the uninitiated. The ladyslippers, the pogonias, the arethusas, the grass-pinks, the bastard hellebores, the several ladies'-tresses, the twayblades, the rattlesnake-plantains, the coral-roots, and the puttyroot or Adam-and-Eve are all members of this versatile family.

The persons who know orchids only as they see them adorning milady's corsage would doubtless be disappointed with the dull clusters of a ragged fringe-orchid or the muddy racemes of a coral-root, or even with the graceful ladies'-tresses, but for all that the initiated will find in them the marvelous mechanisms common to all orchids. By a twist in the ovary of the flower, what would otherwise be the upper petal is made the lower. This is termed the lip. It is often grotesque in shape, frequently striking in color, sometimes fringed or furrowed, and occasionally has a spur-like appendage which secretes nectar. Darwin found that the original orchid flower consisted of 15 parts—three petals, three sepals, six stamens, and three pistils, and he was able to show traces of all 15 of these in the modern orchid.

In the higher types of these flowers the insect guest, probing for nectar, touches the sticky disks to which the pollen mass is attached. These adhere to its body and draw the pollen out of the anthers as the insect withdraws from the flower, and is thus carried to the next flower visited. In some species certain cells in the flower are highly irritable, and in a high state of tension. A mere touch causes an explosion which hurls the pollen mass out of the anther in such a way that it always lands on the end to which the sticky disk is attached and thus becomes fastened to the insect.

Flower lovers esteem the orchids such beautiful creations and are willing to pay such high prices for rare specimens, that they have become the most sought-after family now known to botany. Hundreds of hybrid *Cypripediums* are in cultivation. Some of them are of marvelous beauty. The list of *Cypripediums* in Standardized Plant Names, published in December, 1923, covers more than twelve pages. Once the tulips were as popular as the orchids are to-day, and the craze for them came to be known as "tulipomania."

## SHOWY LADYSLIPPER

*Cypripedium reginae* Walt.

Minnesota State Flower

(See Page 183)

When Minnesota officially decreed, in 1893, that the showy ladyslipper or moccasin flower should be its favorite, it led all the States in enacting such legislation, and it is the only Commonwealth which has selected a member of the orchis family.

While *Cypripedium acaule* was usually cited as the State flower, *Cypripedium calceolus* was the one designated in the legislation. But later it was discovered that the latter species is not found within the boundaries of the State, and so in February, 1902, the legislature changed the designation to *C. reginae*.

Living in peat bogs, or in rich, low, wet woods, flowering from June to September, and having a range that reaches from Nova Scotia to Georgia and from the Atlantic to the Mississippi, the showy ladyslipper has been voted by Dr. Gray the most beautiful belle that ever came out from beneath an orchid roof-tree. It never parades its beauty, but rather tries to remove itself as far from man's comings and goings as it can, and it succeeds so well that only the one who is willing to take pains can approach its dwelling place and behold its glory in its native environment.

Further than this, it is so persistent in its efforts to be let alone that it has come to have tiny glandular hairs which contain an oil that is somewhat poisonous to the human skin, and it is said that a number of cases of dermatitis have followed the efforts of flower lovers to carry it in triumph out of the woods.

As a member of the orchis family, the showy ladyslipper shares the tradition of that family's origin, which is one that is neither beautiful nor attractive; for the first Orchis was the son of a nymph and a satyr, hence a fellow of unbounded passion. At a festival of Bacchus, being warm with drink, he attacked a priestess; whereupon the whole congregation fell upon him and rent him limb from limb. His father prayed the gods to put him together again, but the gods refused, tempering their severity, however, by saying that whereas the deceased had been a nuisance in his life, he should be a satisfaction in his death; so they changed him to the flower that bears his name. Even the flower was alleged to retain temper, and to eat its root was to suffer momentary conversion into the satyr state.

## PINK LADYSLIPPER

*Cypripedium acaule* Ait.

(See Page 185)

This orchid loves the deep woods and seeks a rocky, sandy place, usually as remote as possible from human habitation. Once the commonest

of orchids, now it is one of the rarest. The friend of the pink ladyslipper who said that it "is generally and destructively appreciated" accurately sized up the situation.

We have heard much about prize fighters being overtrained and extinct mammals being overspecialized, and now it has been said that this flower is overorganized. It is preëminently one that believes in the doctrine of cross-fertilization, and therefore has developed so complex a system of protecting its stigmas and anthers from self-fertilization that it often defeats its own ends and must rely on root propagation.

In order to insure itself the cross-fertilization it demands, the stamens are placed back of the pistil in such a position that the pollen cannot be transferred except by outside agencies. The open end of the pouch is nearly closed with a singular broad, scoop-shaped, sterile anther which shields the fertile anthers and stigma. The flower is so arranged that the bee which applies for a cup of nectar must come inside and do a little crowding to get room enough to stand. When the delightful draught is quaffed and the winged beggar turns to leave, it is confronted with a straight and narrow way out, and before the open can be reached our bee must squeeze under a receptive stigma covered with sticky hairs which comb the pollen grains from the fuzzy back of the visitor. But still the guest has not satisfied the flower's bill. It must carry pollen to some other flower. And so, working its way out, the bee has to creep under an anther that is placed almost across its path, getting a coating of pollen as it passes to take the place of that combed out by the pistil.

It is a short stay that the blossoms of the pink ladyslipper make in their annual visit to the woods. They come in May and say farewell in June. The plant gladdens some of the Canadian woods, reaches as far south as North Carolina, and makes Minnesota its westernmost home.

#### SMALL YELLOW LADYSLIPPER

*Cypripedium parviflorum* Salish.

(See Page 184)

Found in woods and thickets over a range that reaches from Nova Scotia and Ontario to Alabama and Nebraska, this romantic little member of the orchis family flowers from May to July. Some of the romance woven around it may be sensed by recalling a few of its vernacular names, such as whippoorwill's shoe, Indian shoe, ducks, and Noah's-ark.

It is practically a miniature edition of the large yellow ladyslipper and has, generally speaking, the same range, but it adds fragrance to its list of attractions.

About the only members of the orchis family that have an economic status are the two species that produce vanilla.

#### ARETHUSA

*Arethusa bulbosa* L.

(See Page 184)

The arethusa, known also as Indian pink and dragon's-mouth, has a range that extends from the Canadian North to South Carolina and Indiana. It is found in bogs and swamps, growing from five to ten inches high, and blossoming in May and June. Its flowers have a violet-like scent.

Linnaeus fancied this flower a maiden in the midst of a spring whence she had gone to find a

place where none could follow her. Recalling the legend of Arethusa, the nymph, changed by Diana into a fountain in order to protect her from the infatuation of the river god, Alpheus, who had become desperately in love with her on seeing her at her bath, Linnaeus gave the flower the name of that nymph.

This name fits the flower even better than the great botanist dreamed. It has been pursued persistently by the lucre-loving orchid hunters who gather it for European collectors and who are more vigorous and unrelenting in their search for the plant than was the god in his unwelcome suit with the nymph.

#### YELLOW FRINGE-ORCHID

*Habenaria ciliaris* (L.) R. Br.

(See Page 183)

This orchid, a perennial, has an ingenious mechanical device to insure cross-fertilization. Its nectar is concealed in a tube so narrow and deep that only the long-tongued butterflies and moths and persistent bumblebees can reach it. There is but one stamen. Just above the stigma there are two pollen clusters, each composed of several small packets of pollen attached together with elastic threads. At the end of these threads is a sticky disk. This disk adheres to the head of the nectar sipper and is carried to the next flower visited. Here, in turn, the pollen packets come into contact with the sticky substance of the stigma and fertilization takes place.

The yellow fringe-orchid is an elegant and stately flower. It ranges from Vermont and Ontario to Florida and Texas and prefers wet meadows and sandy bogs, where it grows from one to two feet tall. It blossoms during July and August.

#### ROSE POGONIA

*Pogonia ophioglossoides* (L.) Ker

(See Page 184)

This attractive member of a charming family, which grows from 8 to 15 inches high, is found in bogs and wild meadows from Newfoundland to Florida and westward to Minnesota and Texas, and also in Japan. It blossoms in June and July, has fibrous roots, and propagates itself by runners as well as by seeds.

A shy, timid plant, the rose pogonia is no more like the intrusive blue sailor in its choice of haunts than the hermit thrush is like the saucy English sparrow. But its aloofness in the selection of its habitat is not greater than the ardor with which it invites insect guests to its board. The beauty of its dainty pink flowers is no more appealing to the eye of the bee than their fresh raspberry odor to its sense of smell. Doubly invited, the bee readily responds, and finds a splendid landing platform, all fringed and crested in its honor. Pushing first its head and then its body in between the platform and the column overhead, in order to feast upon the cup of nectar beyond, the bee brings its back into contact with the sticky stigma to which adhere any pollen grains brought from another flower.

#### ORPINE FAMILY

*Crassulaceae*

Although comparatively few members of the orpine family have established themselves in the United States, it is one of considerable proportions,



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COMMON ROSEMALLOW  
*Hibiscus moscheutos* L.  
MALLOW FAMILY  
(See Page 149)





LOW POPPY-MALLOW  
*Callirhoe involucrata* (T. & G.) A. Gray  
 MALLOW FAMILY  
 (See Page 152)



CRIMSON-EYE ROSE-MALLOW  
*Hibiscus oculiroseus* Britton  
 MALLOW FAMILY  
 (See Page 152)

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with about 600 species whose structure and traits divide them into about 30 genera. The orpines are herbs or near-shrubby plants, mostly fleshy or succulent. South Africa is the center of the orpine world. The plants of this family are noted for their ability to thrive in dry, poor soil and especially in rocky places.

Among the orpines in the United States are the pigmy-weeds, the roseroots, the liveforevers, the stonecrops, the widow's crosses, and the houseleeks. The stonecrops, of the genus *Sedum*, get their Latin name from their squattiness, and their English name from their ability to thrive among stones.

Many species of orpines spread by many-branched creeping rootstocks; others through runners which perish after a new plant has started and thus break the connection between the old and the new plants; still others, by producing buds at the edges of the leaves. When these touch the ground a new plant begins to grow.

### GOLDMOSS

*Sedum acre* L.

(See Page 185)

Goldmoss is one of those flowers that, growing weary of the coddling of the flower garden, has listened to the call of the wild and gone out to find its own place in the sun. It still prefers, however, to gladden the paths of people and is usually found along roadsides and on rocks. It came from Europe to America as a desirable alien, and has spread its colonies from Nova Scotia to Ontario and as far south as Virginia. It has many aliases, such as bird's-bread, creeping-Charlie, gold-chain, tangle-tail, poor-man's pepper, treasurer-of-love, and love-entangled, which give some idea of how it has entwined itself into the folklore of the country. An old English name was "Welcome-home-husband-though-ever-so-drunk."

In keeping with its life in dry situations, the bulk of the tissue is succulent, forming a water store that is protected from evaporation by a thick skin.

### PARSLEY FAMILY

*Apiaceae*

By some called the carrot family and described as *Ammiaceae*, and by others titled as above, the parsley family embraces a large group of herbs with the usual characteristics that place a number of plants together in a family relationship, and yet with other attributes that make them seem far away from one another in their kinship.

This group of plants, embracing some 2,000 species which naturally fall into some 250 genera, has less taste for the Tropics than most families. Its members are essentially dwellers in temperate climates.

It includes the snakeroots, the eryngos, the carrots, the parsleys, the Venus'-comb, the coriander, the cicelies, the chervils, the pimpurnels, the parsnips, the marsh-pennyworts, the water-hemlocks, the poison hemlocks, the celeries, and many other diverse species.

Asafoetida, dill, and anise are about as diverse substances as one could imagine coming from a single family of plants, and yet all of them are obtained from species of the parsley family.

### COMMON CARROT

*Daucus carota* L.

(See Page 186)

Making itself a great nuisance to the farmer, and to the horses and cattle that eat the hay and grass into which it has intruded itself, the common carrot is an immigrant from Europe that has established itself throughout almost the entire United States. As the ancestor of the table carrot much can be forgiven it. The widespread distribution of this far-flung colonizer may be gathered by the number of aliases under which it passes in various parts of the country such as, bird's-nest, Queen Anne's-lace, laceflower, devil's-plague, and ranti-pole. Flowering from June to September, the blossoms of the carrot are lacy and attractive when in their prime, but as the frosts come and Nature becomes brown and sere they acquire a careworn, disheveled appearance that makes them anything but beautiful.

The domestication of the carrot dates back to a period beyond historical times. Pliny reports that the finest specimens were brought to Rome from Candia. It is supposed to have been taken to England by the Dutch in the reign of Queen Elizabeth. In the writings of Parkinson it is related that the ladies wore carrot leaves instead of feathers in their hair at balls and banquets.

### GOLDEN MEADOW-PARSNIP

*Zizia aurea* (L.) Koch

(See Page 185)

Blooming from April to June, in fields, meadows, and swamps, from New Brunswick to Saskatchewan, and from Florida to Texas, the golden meadow-parsnip grows from one to three feet in height. It is a very common perennial which frequents the roadside throughout its territory. Collecting in many small clusters, the tiny flowers carry out the department store type of advertising characteristic of the aster family, whose members include the goldenrods, the asters, the sunflowers, and the thistles. The stamens are prominent and the insect visitors numerous. Many kinds of two-winged flies and small butterflies are regular guests at the golden meadow-parsnip's table, but only a few bees are attracted by its offerings.

### PASSIONFLOWER FAMILY

*Passifloraceae*

Consisting of climbing vines and erect herbs, the passionflower family possesses some 350 species, divided into about 18 genera. South America is the center of the family's habitat and warm and tropical regions its preferred climate. Only a few species have been able to gain any substantial hold on the soil of the United States.

The early Spanish settlers in America gave the family its name. They saw in the blossoms the typification of the passion of the Master; the ten colored parts of the floral envelope represented the ten apostles who had remained loyal to Him throughout; the showy corona of filaments bespoke the crown of thorns; the five stamens represented His five wounds. Other parts of the flower were similarly typical to their minds of the closing hours of the life of the Man of Galilee.

A few species of passionflowers are able to live out of doors in the latitude of Washington, D. C., while other species cannot even bear the winter temperatures of the Gulf States.

## MAYPOP

*Passiflora incarnata* L.  
Tennessee State Flower  
(See Page 186)

The State Horticultural Society has voted in favor of the maypop, or passionflower, as the State flower of Tennessee. The selection seems to be a popular one with the people of the State, and it has been given at least semiofficial recognition.

A climbing vine, sometimes attaining a height of 30 feet, the maypop flowers from May to July over a territory that reaches from Virginia and Missouri to Florida and Texas. The fruit, which is as large as a hen's egg, is a berry which becomes lemon-colored when ripe. The pulp is white and of a peculiar sweetish flavor that one either likes or dislikes very much. It is said that only a minority of those who taste it relish it.

## PEA FAMILY

*Fabaceae*

Like the orchis and aster families, the pea clan is one of Nature's most successful groups of plants. It embraces about 325 genera, subdivided into some 5,000 species, which run the gamut in size and structure from exotic herbs to hardy trees. The versatility of the family is well illustrated by the fact that in it are included the silky sophora, the American yellow-wood, the several species of thermopsis, the wild-indigo, the rattleboxes or loco-weeds, the lupines, the several brooms, the alfalfas, the medicks, the clovers, hop clovers, sweetclovers, and tickclovers, the several trefoils, the vetches, the Indian breadroot, the goat's-rue, the psoraleas, the peas and sweet peas, the wisteria, the locusts, the ground plums, the oxytropes, the licorice, the pencil-flowers, and the beans.

The members of the family have as their principal external characteristic the butterfly-like flower and simple pod of the common pea.

The farmers of other days called some of the members of the pea family wolf plants, because they thought these plants impoverished the soil, noticing that where they thrived the land was usually poor—hence the name lupine (*lupus*, wolf). But now we know that they are simply able to thrive where the ground is too poor for other plants—in gravelly banks, along railway cuts or embankments, on sunny hills, where they send their roots too deep to be conquered by fierce sunshine and protracted draught.

To-day scientific agriculture shows us that the members of the pea family are perhaps the world's foremost nitrogen laboratories. They are able to break down the ties of affinity that bind the nitrogen atoms to those of oxygen in the air, and to store up the nitrogen in their stalks and leaves, thanks to their partnership with the nitrifying bacteria of the soil; and the farmer who employs the members of the pea family to gather his nitrogen instead of importing it from Chile, or Niagara Falls, gets it at a mere fraction of the cost of the commercial product.

## BLUEBONNET

*Lupinus texensis* Hook.  
Texas State Flower  
(See Page 187)

When the legislature of Texas came to consider the issue raised by the flowers in their respec-

tive bids for Lone Star fame, it had a wide range of candidates, active and receptive, from which to choose. There were primroses and phloxes, euphorbias, salvias, Texasplumes, rainlilies, and Indian paintbrushes, but the Texas bluebonnet—a different flower, by the way, from the bluebonnets of Europe—won the day, and was crowned queen of Texas' floral empire. It blooms in the spring and has a range rather more limited than most of the State flowers. One authority tells us that it is a great home body and never crosses the Texas line or the Mexican border. But when it is recalled that Texas is approximately as large as all the Atlantic seaboard States down to and including South Carolina, it will be seen that it has a rather extensive habitat at that.

There are about 70 species of lupines in North America, mostly in the West. They can justly lay claim to being among the most brilliant of all the denizens of Nature's garden. They transform many a sandy waste into an oasis of color. The blossom has five petals, the upper one an advertising banner announcing to the passing bee that the table within is laden with choicest viands, and that no daintier food was ever served in flower land. There are two side petals which serve as landing stages for the aeronauts of insectdom and two others which touch at the bottom and resemble the keel of a boat. When the bee alights on the landing stage the keel opens up, and the table, all set and garnished, greets the hungry visitor's eye.

The lupines sleep at night. Some species transform their horizontal stars of day to vertical stars at night; others shut them down around the stem like an umbrella around the ferrule.

## RED CLOVER

*Trifolium pratense* L.  
Vermont State Flower  
(See Page 188)

The red clover, which the legislature of the Green Mountain State has decreed shall be accorded the honor of standing at the head of the Vermont floral procession, finds itself at home in all temperate America.

The clover is an extraordinary seed bearer. Darwin counted those of a large number of heads and found an average of 27 seeds per flower head. But when he kept the insects away not a single seed was set.

The clover blossom is preëminently the bumblebee's flower. When Australia first undertook to add this legume to her list of forage crops, as fine-looking fields of clover as one could imagine appeared in due time. But somehow the heads did not set seed and it seemed that failure was to follow the experiment. On looking around for a possible cause of this failure, it was found that the clover's best friend, the bumblebee, had not been imported along with the seed. As soon as this faithful servant was brought in and given time to establish itself, there were lively, hopeful days in the antipodean clover fields and no more failures of the crop to provide for future sowings.

The butterfly, too, long of tongue, can sip the nectar of these blossoms; but the lightweight insects with short tongues need not apply. The clover hides its sweets beneath a reddish lock that can be opened only by long tongues or heavy weights.

The child who has not plucked the tiny florets of the clover and tasted their nectar is to be





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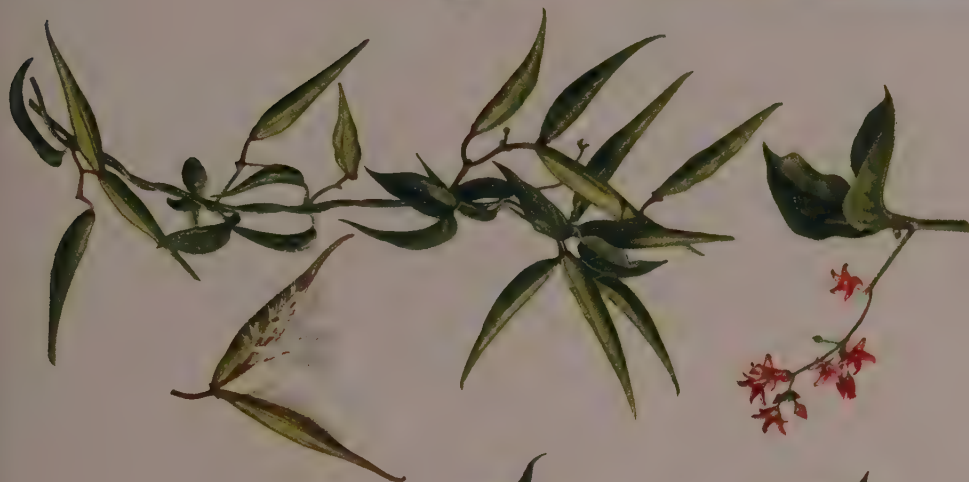
CHECKERBLOOM  
*Sidalcea malvaeflora* (Muc. & Sesse) A. Gray  
 MALLOW FAMILY  
 (See Page 152)



COMMON MEADOWBEAUTY  
*Rhexia virginica* L.  
 MEADOWBEAUTY FAMILY  
 (See Page 152)



COMMON MILKWEED  
*Asclepias syriaca* L.  
MILKWEED FAMILY  
(See Page 152)



BLACK SWALLOW-WORT  
*Cynanchum nigricum* (L.) Pers.  
MILKWEED FAMILY  
(See Page 153)



FOURLEAF MILKWEED  
*Asclepias quadrifolia* Jacq.  
MILKWEED FAMILY  
(See Page 153)

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placed in the same category as the girl who has not taken a daisy and plucked the petals to the tune of "He loves me, he loves me not," for neither has known the simple joys of the field.

When James Whitcomb Riley asked what the lily and all the rest of the flowers were to a man who in babyhood knew the sweet clover blossom, it was not that he loved the lily less, but that he loved the clover more.

One who has seen a herd of fine cows, sleek and fat and trim, in a field of red clover, readily understands the force of the phrase "Living in clover" as a description of wordly affluence. But even the cows have no advantage of the bumblebee and the butterfly when it comes to the joy the clover field gives, for neither oxeye daisies, black-eyed-susans, goldenrods, nor ironweeds can afford such rich pastures for these insects as the well-cultivated meadows of clover offer them.

For ages the clover has figured in the mysticism of the Caucasian races. The four-leaf specimen is regarded as a harbinger of good luck when one finds it growing, although it is probably more an evidence of the finder's powers of observation and, therefore, of ability to get on in the world. In Europe the peasants declare that a dream about clover foretells a happy marriage, long life, and prosperity. There is another superstition to the effect that if one carries a four-leaf clover at Christmas time it will bring the ability to see witches and sprites. Still another fancy is expressed in the old couplet to the effect that finding an even ash leaf or a four-leaf clover is sure to bring a sight of the finder's sweetheart before the day is over.

Clover is thought by the herb doctor to have some medicinal properties. For instance, it is claimed that a syrup made from its blossoms is a cure for whooping cough; and many a country child knows the joy of red clover tea at impromptu parties.

The clover is not a native American plant. It was brought here from Europe, where it is widely cultivated; and, again, it is only a settler in Europe, for it originally migrated there, like so many other plants of economic value, from Asia. However, it has a right to be called a bluestocking among our flowers, for it is one of those favored individuals of the plant world that enrich the soil as they grow. Man has been long ages learning how to extract nitrogen, the most expensive of all fertilizing elements, from the air; but the clover learned that secret untold centuries ago, and instead of levying heavy tribute on the nitrogen supply of the ground, it draws its supplies from the air, uses what it can, and presents the remainder to the land with its compliments.

It joins the cowpea, the soybean, the locust tree, and other legumes in being a great supporter of soil fertility. Compare the sod under the next locust tree you see with that under an oak, and you will realize why the clover and its cousins are allies of the progressive farmer.

### ALFALFA

*Medicago sativa* L.

(See Page 187)

While alfalfa is generally known as a forage plant, it has shown some ability to leave the farmer's fields and strike out for itself. It is, therefore, sometimes encountered as a wild flower between Maine and Virginia, and westward to the Pacific

coast, growing from one to one and one-half feet high and flowering from June to August. Several crops may be harvested on the farms in the course of the summer.

It is a leguminous plant which gathers nitrogen from the air, uses what it needs, and sends the "crumbs," as it were, into the soil. As these legumes reverse the process of those plants which extract nitrogen from the soil, they are known to the farmer as great promoters of soil fertility. In England alfalfa is known as lucerne. The name "alfalfa" is of Arabic origin, and means the "best fodder," a verdict rendered by the Arabians and affirmed by American experience.

Alfalfa was introduced into Italy from the eastern Mediterranean countries in the first century, A. D. The Spaniards gave it further vogue in Europe, and finally, about 1650, it was introduced into England. Sometime before that it was brought to Mexico, later to California, and in the middle of the nineteenth century it began to command the favor of American farmers, generally.

### BEACH PEA

*Lathyrus maritimus* (L.) Bigel.

(See Page 188)

The beach pea rejoices in numerous other names, among them one denoting a rugged vitality—everlasting pea.

To its admirers it mirrors the sea and the heavens—the clear green of the ocean in its leaves and the azure hues of the sky in its petals. It gladdens the sandy beaches of the seashore from New Jersey to the Arctic regions and from southern Oregon to northern Alaska.

The style of the flower's pistil is hairy on its inner side, and when the nectar-seeking bee lands for a sip of sweetness his movements cause the style to vibrate. It thus becomes an automatic duster, brushing the pollen onto his coat.

The beach pea, like many other members of the pea family, has worked out its own system of cross-fertilization.

### HOARY TICKCLOVER

*Desmodium canescens* DC.

(See Page 187)

The hoary tickclover, sometimes known as the hoary tick-trefoil, has a range that reaches from Ontario to Massachusetts and Florida, and westward to Minnesota and Texas. It prefers rich soils for its environment, and is in flower from July to September. In the tickclover we have another example of the way various families of plants undergo parallel evolution. The beggarticks and the Spanish needles succeed in sending their colonies abroad by attaching little hooks to their seeds. These fasten themselves in the hair or wool of passing animals, or on the clothing of man, and thus employ animal transport in their colonization schemes. The tickclovers have developed the same method of sending their children away from the home roof-tree, as it were, and with marked success.

### PHLOX FAMILY

*Polemoniaceae*

The phlox family consists of some 200 species grouped in about 20 genera, and makes western America its favored region. It is noted for its



high percentage of showy flowers. Some of the notable species of this family are the garden phlox, an escape from the flower garden; the gillias, the polemonium or Greek-valerian, the collomias, and the American Jacob's-ladder.

### SWEET-WILLIAM PHLOX

*Phlox maculata* L.

(See Page 189)

This pleasing member of the phlox family lives along streams and in moist woods east of the Mississippi River and south of Massachusetts. Its flowering season extends from mid-June to late August and it has a stem growth of one and one-half to three feet. It frequently escapes from cultivation farther north and wanders along dry and dusty roadsides. Hawthorne's little red cottage at Lenox, Massachusetts, lies in ruins, but the white phlox his wife planted there has not only survived but has spread over the hillside.

In order to defend their sweets against pilferers who could render them no service as pollen carriers, many of the phloxes have coated their upper stems and the base of their flowers with a sticky substance that forms an effective barrier to approach. Thus the phlox does for itself what men do for the trees in keeping the caterpillars from reaching the branches.

### CREeping POLEMONIUM

*Polemonium reptans* L.

(See Page 189)

The creeping polemonium is a dainty flower that flourishes in open woods from New York to Georgia and westward to Minnesota and Kansas.

Some of the garden varieties of phloxes have been bred from *Phlox drummondii*, a Texas species. The tall, sweet-scented garden phloxes were bred from *P. paniculata* and *P. maculata*. Europe, appreciating our wild flowers more than we do, carried representatives of these species across the Atlantic and developed therefrom many beautiful varieties that came back to America to thrill millions of flower lovers.

### PICKERELWEED FAMILY

*Pontederiaceae*

This family is one of the smallest encountered in the whole floral world. Only 25 species have been described and these are either aquatic or bog-dwelling plants. They are perennial herbs. In addition to the pickerelweeds the family includes the mud plantains and the water stargrasses. The genus name of the pickerelweeds, *Pontederia*, was given in honor of Giulio Pontedera, professor of botany in the University of Padua.

### PICKERELWEED

*Pontederia cordata* L.

(See Page 189)

The pickerelweed is one of the members of the plant kingdom that insists upon making its home in the water, usually preferring the shallow waters of a stagnant pond.

It is a tall plant, with one blunt, arrowhead-shaped leaf, varying to an elongated triangle. Above this leaf rises a spike about four inches long, from which issue numerous more or less

irregular ephemeral, violet-blue flowers, each marked with a distinct yellow-green spot.

That ever delightful biographer of the folk of Nature's garden, Neltje Blanchan, called the pickerelweed a vigorous wader, a sort of floral crane, and reminds us that in the backwoods people think that this plant is the favored resort of the pickerel when she deposits her eggs.

A botanist who made a careful study of *Pontederia cordata* says that its flowers occur in three forms, not on the same, but on different plants, excelling even the purple loosestrife in the striking type of its several forms.

Unable to set seed without insect aid, they resort to what seems little short of marvelous tactics to get the maximum benefit out of the visits of their winged guests. In one type of flower the stigma is raised on a long style to the very top of the blossom; in the second type the stigma comes half way up the flower cup; in the third type it remains at the bottom.

### PINE FAMILY

*Pinaceae*

The flowering plants of the world are divided into two classes, those having naked and those having enclosed seeds. The former are known as gymnosperms and the latter as angiosperms. The pine heads the list of gymnosperms, and the trees of this class date from Silurian times, when fishes began to appear in the waters of the earth and shell-forming sea animals were the dominant fauna. On through the Age of Fishes, through the age in which land animals with backbones appeared, and into the early part of the Age of Reptiles, the gymnosperms continued to thrive, reaching their maximum development in the latter or Triassic Age. To-day the pines and yews are our American survivals of the conifers of those tremendously remote times. The pine family contains about 25 genera and some 240 species, including the pines, the larches, the spruces, the hemlocks, the firs, the cedars, and the juniper trees.

### WHITE PINE

*Pinus strobus* L.

Maine State Flower

(See Page 190)

When the school children of Maine elected the pine cone and tassel as the floral standard bearer for their State, they not only followed the precedent that made theirs the "Pine Tree State," but they honored the first-born of the flowering plants; for science tells us that in the long process of evolution, when some of the members of the fern family began to strive for higher things, their first success on the road to perfection was to become cone bearers. And so to-day the cone bearers remain the great middle class in the flower world between the plebeian fern on the one hand and the patrician rose and the noble lily on the other.

How wonderful and how charming is the story of the pine's household economy! It is so equipped that it can make its home down in the lands of tropic warmth or up in the regions of polar snow. The last tree one meets, almost, on a climb to the high summits of snowcapped mountains is the pine. The gale may blow so hard and so persistently that not a limb is able to grow on the windward side; but, twisted and misshapen, the pine still lives on.



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BUTTERFLYWEED  
*Asclepias tuberosa* L.  
MILKWEED FAMILY  
(See Page 152)



© N. G. S.  
**PURPLE WILDBERGAMOT**  
*Monarda media Willd.*  
 MINT FAMILY  
 (See Page 153)



**GROUND-IVY**  
*Glechoma hederacea L.*  
 MINT FAMILY  
 (See Page 156)



**HYSSOP SKULLCAP**  
*Scutellaria integrifolia L.*  
 MINT FAMILY  
 (See Page 156)



**HAIRY WILDBERGAMOT**  
*Monarda mollis L.*  
 MINT FAMILY  
 (See Page 153)



Though the winds seem harsh to the pine, they are none the less its good friends. It employs them as the messengers in the spreading of its pollen. The pistils and stamens grow in separate flowers, and the breezes transport the pollen from tassel to cone and from tree to tree. Each grain is provided with two tiny bladders which give it buoyancy and enable it to take a balloon ride. In the region where the winds blow the hardest they serve the conifers best, for there insects are scarce and the trees might be exterminated if they had to depend on such pollen bearers. This is only another evidence of the natural ability of the pine to adjust itself to its surroundings. The tree that could go on and on through numberless generations evolving a conifer out of a fern naturally would have adaptability enough to meet the wind both as foe and friend.

As a messenger the wind is wasteful, and so the pines, to perpetuate their species on earth, must produce vast quantities of pollen.

In the flowering season of the pines the air is filled with tiny grains of yellow dust, the ponds are covered with a golden scum, and one sees evidences of pine pollen everywhere. This pollen is shed from small tassels which occur at the base of the green shoots that form the current year's growth. Upon the under side of each scale of every pistillate cone is a tiny bag of jelly. When a pollen grain flies that way and gets stuck in this little bed of jelly, the scale closes up so as to be water-proof and air-tight. Some of the pine species even varnish the openings so as to make them safe. Within this cozy chamber the miracle of life is consummated, and ere long there is a small seed, with its wing attached, mature and awaiting the day when the friendly wind will carry it to the place in which it can plant itself and grow up into a big tree.

When the cone dies, the seeds it harbors live on. During the winter months the squirrels improve every fair day to gather pine seeds for their present needs and their future wants. If you have ever watched a squirrel open up a pine cone, you have wondered how he learned so well the art of getting seeds out easily. He handles the cone as adeptly as a trained athlete might handle a weight. He takes it in his forefeet, hurls it bottom upward, as if he were a professional juggler, and then begins to gnaw at the base of the lowest row of cells. Presently an opening reveals a seed or two. Thus he goes around and around the cone, taking each scale in its order, and before you could do it by hand he has unlocked every one of them.

The cones the squirrels do not get hang on as if they were the "pimply plums" of Uncle Remus' story. But when the first faint evidences appear that the balmy warmth of spring is to succeed the icy breath of winter, there comes a popping and a cracking in the pine forest, and the seasoned woodsman knows that the cones are firing salutes of welcome to the approaching spring. As the months pass on, one by one the cones dry out, the bended bows of their many scales are released as the drying-out process pulls the hair trigger that holds them, and ten thousand thousand winged seeds fly out into the world with the ambition to transform themselves into trees.

It is interesting to gather a number of different species of pine cones before they have begun to open and watch them do so. Some of them jump around like things possessed as the scales on which they rest open up; others roll this way and turn

that. When the last scale is open and the last seed is out, the cone may be three times as large as it was formerly and a hundred or more seeds have been set free. Alas, how few of these ever become trees. We are told, for instance, that a big tree in California produces from 100 to 200 seeds to a cone and as many as 1,000,000 cones to the tree—that is, 100,000,000 seeds in a single season.

There are 42 native species of pines in the United States. They make the woods of Maine and other northern States largely evergreen. Countless generations of warring with the elements led them to adopt the needle instead of the leaf, for needles do not oppose the free passage of the wind or afford snow a platform which could crush them. Hence it is that the pines "bind the tottering edge of cleft and chasm and fringe with sudden tints of un hoped-for spring the Arctic edges of retreating desolation."

## PINK FAMILY

### *Silenaceae*

The pink family consists of about 20 genera and some 600 species, widely distributed, but mostly abounding in the Northern Hemisphere. It includes the pinks, the corncockle, the catchflies, the ragged-robin, the Maltese cross, and the old reliable bouncing-bet. There is a sweet-william pink, as well as a sweet-william phlox.

Several species of pinks are cultivated by florists, and a few are used in medicine. Bouncing-bet and the red campion yield a mucilage resembling soap. The clove pink is the ancestor of all the cultivated species of carnations.

## RED CARNATION

*Dianthus caryophyllus L.*

Ohio State Flower

(See Page 190)

When man first looked upon the red carnation and conceived the plan of leading it captive to grace the flower garden and to add to the shekels in the florist's purse, it was the modest little clove pink, such as may still be seen on the slopes of turf that succeed the great chalk cliffs of the Cheddar Gorge, in Somerset County, England. The Briton considers it one of the rarest wild flowers in Nature's garden.

How long it is since the carnation joined the ranks of domesticated flowers no one can say with certainty, but that it was a favorite flower in Queen Elizabeth's day is certain. The "Winter's Tale" was published in 1623. In that play Shakespeare tells us that "the fairest flowers of the season are our carnations."

Many honors have been paid the carnation by man, and in its turn it has helped honor the memories of those who have counted for something in our lives. The scarlet carnation was William McKinley's flower, and to this day Americans who pause to honor his memory wear it on his birthday. When the movement for an annual "Mothers' Day" reached important proportions, it was a white carnation that was set aside as the badge of her purity, her goodness, and the nobility and self-sacrifice of her soul. To-day the white carnation is worn in honor of the mother who is dead, and a colored carnation for the living mother.

Horticulturists have vied with one another in producing carnations of rare beauty, some of which have won nation-wide reputations and names. Men have given many thousands of dollars for control of a new variety.



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ORANGE POLYGALA  
*Polygala lutea* L.  
 MILKWORT FAMILY  
 (See Page 156)

FRINGED POLYGALA  
*Polygala paucifolia* Willd.  
 MILKWORT FAMILY  
 (See Page 156)



SENSITIVE PLANT  
*Mimosa pudica* L.  
MIMOSA FAMILY  
(See Page 157)



AMERICAN MISTLETOE  
*Phoradendron flavescens* (Pursh) Nutt.  
MISTLETOE FAMILY  
Oklahoma State Flower  
(See Page 157)





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HEDGE BINDWEED  
*Convolvulus sepium* L.  
MORNING-GLORY FAMILY  
(See Page 160)



FIELD BINDWEED  
*Convolvulus arvensis* L.  
MORNING-GLORY FAMILY



COMMON MOONSEED  
*Menispermum canadense* L.  
MOONSEED FAMILY



CHARLOCK  
*Brassica arvensis* (L.) Ktze.  
MUSTARD FAMILY



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COMMON HOP  
*Humulus lupulus L.*  
NETTLE FAMILY  
(See Page 161)



CLAMMY GROUNDCHERRY  
*Physalis heterophylla Nees.*  
NIGHTSHADE FAMILY  
(See Page 161)





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**BITTER NIGHTSHADE**  
*Solanum dulcamara L.*  
 NIGHTSHADE FAMILY  
 (See Page 161)



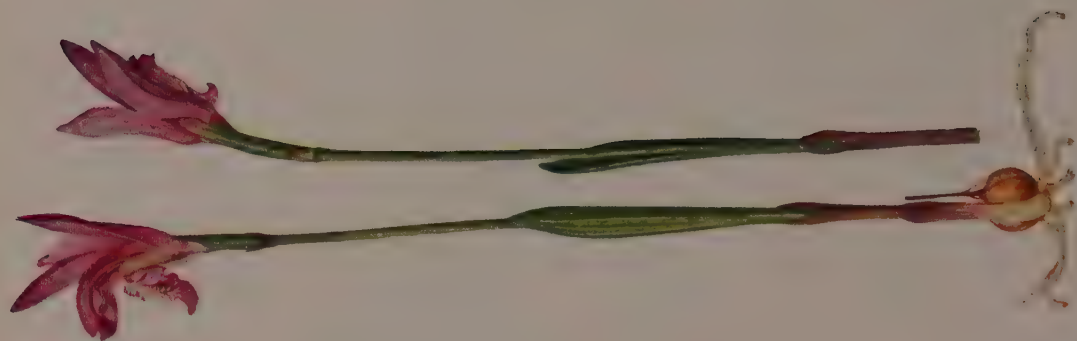
**COMMON LILAC**  
*Syringa vulgaris L.*  
 OLIVE FAMILY  
 New Hampshire State Flower  
 (See Page 164)



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**YELLOW FRINGE-ORCHID**  
*Habenaria ciliaris* (L.) R. Br.  
 ORCHIS FAMILY  
 (See Page 165)

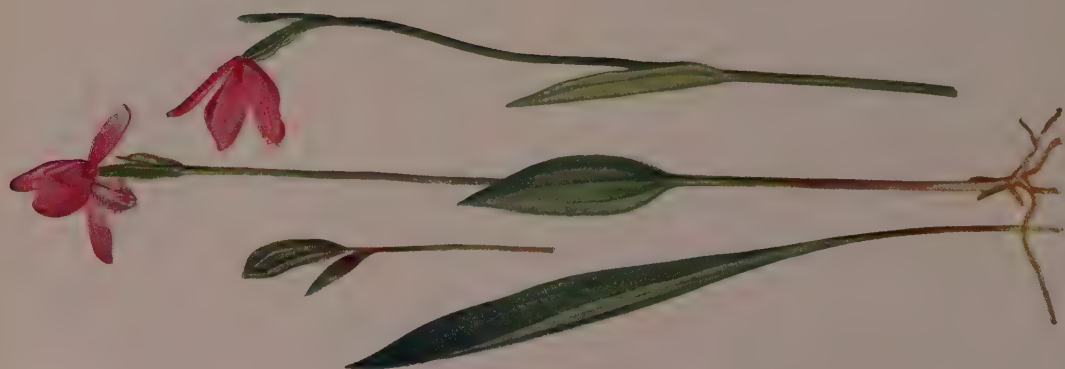
**SHOWY LADYSLIPPER**  
*Cypripedium reginae* Walt.  
 ORCHIS FAMILY  
 Minnesota State Flower  
 (See Page 164)



ARETHUSA  
*Arethusa bulbosa* L.  
ORCHIS FAMILY



SMALL YELLOW LADYSLIPPER  
*Cypripedium parviflorum* Salisb.  
ORCHIS FAMILY



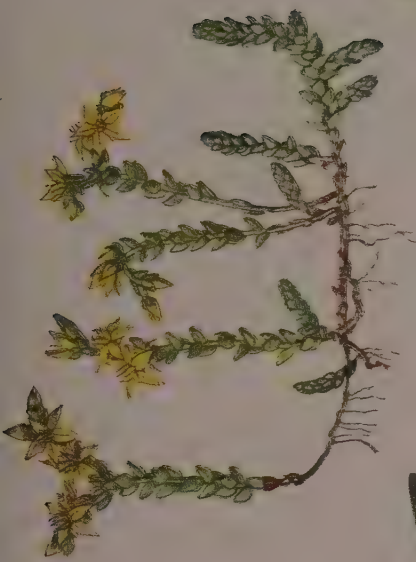
ROSE POGONIA  
*Pogonia ophioglossoides* (L.) Ker  
ORCHIS FAMILY





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PINK LADYSLIPPER  
*Cypripedium acaule* Ait.  
ORCHIS FAMILY  
(See Page 164)



GOLDMOOSE  
*Sedum acre* L.  
ORPINE FAMILY  
(See Page 168)



GOLDEN MEADOW-PARSNIP  
*Zizia aurea* (L.) Koch  
PARSLEY FAMILY  
(See Page 168)



MAYPOP  
*Passiflora incarnata* L.  
 PASSIONFLOWER FAMILY  
 Tennessee State Flower  
 (See Page 160)



COMMON CARROT  
*Daucus carota* L.  
 PARSLEY FAMILY  
 (See Page 168)



BLUEBONNET  
*Lupinus texensis* Hook.  
PEA FAMILY  
Texas State Flower  
(See Page 169)



ALFALFA  
*Medicago sativa* L.  
PEA FAMILY  
(See Page 172)



HOARY TICKCLOVER  
*Desmodium canescens* DC.  
PEA FAMILY  
(See Page 172)

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BEACH PEA  
*Lathyrus maritimus* (L.) Bigel.  
 PEA FAMILY  
 (See Page 172)



RED CLOVER  
*Trifolium pratense* L.  
 PEA FAMILY  
 Vermont State Flower  
 (See Page 160)



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SWEET-WILLIAM PHLOX  
*Phlox maculata* L.  
PHLOX FAMILY  
(See Page 173)



CREeping POLEMONIUM  
*Polemonium reptans* L.  
PHLOX FAMILY  
(See Page 173)

PICKERELWEED  
*Pontederia cordata* L.  
PICKERELWEED FAMILY  
(See Page 173)



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WHITE PINE  
*Pinus strobus* L.  
PINE FAMILY  
Maine State Flower  
(See Page 173)



RED CARNATION  
*Dianthus caryophyllus* L.  
PINK FAMILY  
Ohio State Flower  
(See Page 176)





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PEATPINK  
*Silene caroliniana* Walt.  
PINK FAMILY  
(See Page 194)



CORNCOCKLE  
*Agrostemma githago* L.  
 PINK FAMILY  
 (See Page 194)



COMMON PITCHERPLANT  
*Sarracenia purpurea* L.  
 PITCHERPLANT FAMILY  
 (See Page 194)



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**NARROWLEAF PLANTAIN**  
*Plantago lanceolata* L.  
 PLANTAIN FAMILY  
 (See Page 195)



**RUGELS PLANTAIN**  
*Plantago rugelii* Decne.  
 PLANTAIN FAMILY  
 (See Page 195)



## PEATPINK

*Silene caroliniana* Walt.

(See Page 191)

An attractive little flower is the peatpink, wild pink, or catchfly, which seeks the dry, gravelly or sandy soil as persistently as the blueflag iris or the common arrowhead seeks the soft alluvial or marshy ground. From April to June its delicate pink petals give cheer to many a lonesome place, and it has succeeded in claiming a rather large area for its occupancy, extending from New England to Georgia and Kentucky.

As fresh as the springtime itself are these little flowers, when they open up to join the floral chorus that proclaims that spring has come to stay. They are flowers which never believe in taking chances, when it comes to the question of fertilization, so they have developed two sets of stamens, five to each set. The one set rises first, then the other, so that if one misses the transfer of its pollen the other is likely to supply the resulting deficiency. After all their pollen is shed, three recurved styles put in their appearance out of the depths of the tube, ready to receive pollen brought by the bees and butterflies from other flowers.

The peatpink finds its cupboard of sweets a fair mark for many tiny insects that are large enough to drain its cup of nectar and yet too small to bear away the flower's pollen to some distant mate. So it has provided an effective lock and key to that cupboard, which makes it proof against the pilferer. This lock and key is a gummy, viscid fluid that the pink secretes and spreads around the sticky stem below the flower. And woe betide the creeping thing that is a thief and a robber from the pink's standpoint! For no fly that ever alighted on a piece of man-made fly paper was more certainly and surely brought to an untimely end than the ant that essays to sip the nectar of a peatpink. Thus we can see that the fly paper idea is not man's invention at all, but an idea borrowed from the pink, which he accuses of having no power of invention at all.

Ordinarily we think of the pink as having a pink flower, and, if we reflect at all, that the color we describe as pink lends its name to the flower; but the etymologists mostly disagree with this opinion. They declare that the pink is the lender and not the borrower, and that the color owes its name to the fact that it so closely imitates the flower. It is said that the word pink, as applied to the flower, is derived from the verb "pinken," meaning "to scallop," so that the flower borrows its name from an act and transfers it to a color. We habitually use the word pink to express our highest ideals along many lines, thus unconsciously paying high tribute to this beautiful little flower and its relatives. A woman we may describe as the pink of perfection and a man as the pink of courtesy.

## CORNCOCKLE

*Agrostemma githago* L.

(See Page 192)

Whether the corncockle is a beautiful flower or a pestiferous weed depends upon the point of view. Like the English sparrow and the rat, it insists upon residing with the farmer, whether he will or he won't, and unless it is to get the better of the argument he must keep fighting all the time.

The oxeye daisy, the yarrow, the mulleins, and the plantains ask no specially prepared seed

beds. They grow side by side with the grasses. But the corncockle is a little more fastidious. It likes the same surroundings as wheat and matures its seeds at the same time. In this way it gets reaped and threshed with the grain, garnered with it, and sown again with it.

Thus it not only steals its bit of ground away from the wheat, but forces the farmer to cultivate it.

Like so many of the weeds that make the farmer's hard life harder, the corncockle is an immigrant from Europe. It is a native of Asia, but followed civilization into Europe, and then crossed the seas to America in earth ballast, in packing straw, and in seed grain.

Once landed on these shores it established itself and swept westward until it claims as its own the entire wheat-, barley-, rye-, and oats-growing territory of the New World.

Even in Shakespeare's time it was a pest. Biron, in "Love's Labour's Lost," exclaims, "Alons! Alons! sow'd cockle, reap't no corn." Still further back in the history of man we find Job exclaiming, "Let thistles grow instead of wheat and cockle instead of barley."

The United States Department of Agriculture classes the corncockle as one of the principal poisonous plants, the dangerous qualities being contained in a soluble, odorless substance called saponin, which possesses a sharp, burning taste and provokes violent sneezing when inhaled, even in small quantities. When agitated in water, it foams like soap.

When the corncockle blossom opens it carries a fine "display ad" in magenta and white, announcing that messengers are wanted to convey pollen to other flowers. The length of the carriers' tongues rather than the fleetness of their wings is the test of employment. One species of night-flying moth never seeks service elsewhere, and while sipping the nectar of the cockle cup and carrying the pollen from the blossom's anthers, also takes occasion to lay its eggs in the heart of the flower, so that its larvae may have a well-stocked larder of immature cockle seeds.

## PITCHERPLANT FAMILY

*Sarraceniaceae*

Britton and Brown tell us that there are about 10 species of pitcherplants, and that they are all natives of America. On the other hand, Dixon says that of all places where a related family thrives the island of Borneo seems to be their especial paradise. "They are as plentiful there," says he, "as the wild morning-glory is in America; small shrubs, bushes, and trees are covered with their variegated and variously shaped pitchers. Some look like small trumpets, others like developed gourds; but all seem diabolically planned death-traps!"

## COMMON PITCHERPLANT

*Sarracenia purpurea* L.

(See Page 192)

Flourishing in peat bogs from Labrador to Florida and westward to the Rocky Mountains, the pitcherplant has the range of vernacular names characteristic of those flowers which invade widely distributed communities. Huntsman's-cup and whippoorwill's-boots are among its local aliases. Adam's-pitcher, fever-cup, small-pox plant, fly-trap, and side-saddle flower are other names it sometimes wears.

The flowering season of the pitcherplant occurs in May and June. The blossom is striking. Its petals are of a deep, reddish purple, sometimes partly greenish or pink, and the style possesses an umbrella-shaped yellowish dilation.

The leaves at the base are hollow and cup-like, reddish and green outside, and pale green, streaked with crimson inside. They are broadly winged and hooded, and become partly filled with water. Insects flock there to quench their thirst, or are attracted by the raw meat appearance and decaying odor. The footing is very insecure, however, and many of them terminate their adventure by slipping helplessly into the water and drowning. In order to prevent the victims from escaping, the leaves are provided with a bristly surface, the hairs of which point to the bottom of the cup, and thus prevent the prisoners' exit.

The insects caught in the pitcherplant's ingenious trap, finding escape impossible, soon give up the struggle and die. The plant seems to have more need of nitrogen compounds than most flowers, and these it draws from the decaying bodies of the imprisoned insects. Several hundred species of carnivorous plants have been found in the world.

## PLANTAIN FAMILY

### *Plantaginaceae*

The plantain family has upward of 225 species, but these are divided into only 3 genera. Some species are annuals and others perennials. Both kinds are hardy battlers for their several places in the sun, much to the vexation of the farmer and lawn owner.

### NARROWLEAF PLANTAIN

#### *Plantago lanceolata* L.

(See Page 193)

Like the charlock, corncockle, and the sheep sorrel, the narrowleaf plantain is an alien which came to our shores as a stowaway and has made America its own. It has sundry names in divers localities, such as ribgrass, narrow plantain, and ripple-grass. It blossoms from June to September and fights stubbornly for position in both field and lawn. Its seeds mature about the same time as clover seed, and it is indeed a "tare among the wheat" when the farmer wants to sow his clover.

This plantain places its homely cone of greenish buds on a tall, grooved stem. These buds mature as brownish minute flowers. The ones at the bottom open first, and then the procession moves up the cone, day by day, until each row of flowers has taken its turn at blooming. These flowers possess long, extending anthers, which, making filamentous stamens, float around the cone as the rings of Saturn around the planet. In the illustration one may see the cones at the various stages.

### RUGELS PLANTAIN

#### *Plantago rugelii* Decne.

(See Page 193)

This plantain resembles the common plantain, *Plantago major*, which is perhaps the best known of the broad-leaved species. Its spikes are a little less dense, at least toward the base, and its leaves are a little thinner and of a brighter green. But otherwise the differences that make

them two species instead of one would escape the eye of the layman.

Rugels plantain is found from New Brunswick and Ontario southward to Florida and Texas. Its flowering season is from June to September.

The common plantain flowers from May to September and has a range that includes nearly all North America and the West Indies. The Indians called the two species white-man's-foot.

## POKEBERRY FAMILY

### *Phytolaccaceae*

The pokeberry family consists of about 22 genera and 110 species, mostly of tropical lands. They are usually herbs, though some species are shrubs, and even trees in equatorial countries. Two Asiatic species are cultivated for their young shoots and foliage.

### COMMON POKEBERRY

#### *Phytolacca americana* L.

(See Page 196)

The pokeberry's range is from Maine to Ontario and southward, where it flowers from July to September, in low grounds and rich soils. It masquerades under many names, such as poke, scoke, garget, and pigeon-berry.

A tall, smooth herb, growing from 4 to 12 feet high and possessing a strong-smelling juice, its roots, which are perennial, are highly poisonous; yet its young shoots, or "sprouts," are edible when cooked and are often prepared like asparagus. Its shining purple berries form a late summer feast for robins, flickers, downy woodpeckers, chewinks, and grosbeaks.

An ointment is made from the plant for the treatment of ringworm and rheumatism, and also for relieving itching and inflammation of the eyes.

The pokeberry is said to have derived its name from an Indian word, "pocan," which is applied to any plant yielding a red or yellow dye. The followers of James K. Polk, in the presidential campaign of 1844, wore the pokeberry leaf as their emblem.

The *Halictus* bees are its principal insect visitors in flowering time. The pokeberry prefers cross-fertilization, bringing its stamens to maturity before its pistils and thus giving insects a chance to carry its pollen to other plants. In stormy, rainy weather, when its benefactors cannot be on the wing, it curves its styles so as to bring the stigmas into contact with the anthers of the stamens, and thus brings about self-fertilization.

## PONDWEED FAMILY

### *Potamogetonaceae*

This family consists of some 70 species, grouped in 4 genera. Its members are perennial, aquatic plants, with floating or submerged leaves, or both.

### NUTTALLS PONDWEED

#### *Potamogeton epihydrus* Raf.

(See Page 196)

This species of pondweed is found in ponds and streams from Newfoundland to British Columbia and southward to North Carolina and Iowa. Its flowering season is from June to August.



NUTTALLS PONDWEED  
*Potamogeton epiphydrus* Raf.  
 PONDWEED FAMILY  
 (See Page 195)



COMMON POKEBERRY  
*Phytolacca americana* L.  
 POKEBERRY FAMILY  
 (See Page 195)





MEXICAN PRICKLEPOPPY.  
*Argemone mexicana* L.  
 POPPY FAMILY  
 (See Page 198)



COMMON CALIFORNIA-POPPY  
*Eschscholzia californica* Cham.  
 POPPY FAMILY  
 California State Flower  
 (See Page 198)

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## POPPY FAMILY

### *Papaveraceae*

The poppy family consists of about 115 species grouped in approximately 23 genera. It is widely distributed, though the greatest number of species occur in the North Temperate Zone. It includes the garden poppy, from which opium is extracted, the bloodroot, and the celandines. The garden poppy not only yields opium, but its seeds contain a bland, fixed oil, used alike in soap-making, cooking, and painting.

### COMMON CALIFORNIA-POPPY

*Eschscholtzia californica* Cham.

California State Flower

(See Page 197)

No State has chosen its representative flower more appropriately than California. The California-poppy, the very essence of California's sunshine, has woven its brightness into the history of the Pacific coast. During the spring months, when it covers valley, field, and mountain side with a cloth of gold, men, women, and children make a festival of poppy-gathering like the Japanese at cherry-blossom time.

Tradition alleges that a tilted mesa north of Pasadena, when aglow with poppies in the spring, used to serve as a beacon to coasting ships more than twenty-five miles away, a tale which is not wisely questioned by one who has never seen the glory of a golden poppy field. Certain it is that early Spanish explorers saw some of the hillsides covered with these flowers and named the coast "The Land of Fire." It was "sacred to San Pascual," they said, "since his altar-cloth is spread upon all its hills."

No State flower had more lovely rivals—baby-blue-eyes, the butterfly or Mariposa tulips, the gillias, the lupines, and other charming blossoms have a firm hold on the affections of Nature lovers in a Commonwealth from whose floral treasures the finest cultivated gardens in the world have been enriched. But the California-poppy safely out-distanced all competitors and is now the crowned queen of the land of the setting sun.

The scientific name of this poppy was acquired when a Russian scientific expedition under Kotzebue, in 1815, explored what is now California. Chamisso, the naturalist of the expedition, named it for Dr. Eschscholtz, a companion naturalist, *Eschscholtzia californica*. It is an unfortunate name; that array of consonants appalls the English eye and paralyzes the English-speaking tongue. Though *copa de oro*, the Spanish "cup of gold," has a poetic attractiveness, yet it is not much used, even by the Spanish Americans.

### MEXICAN PRICKLEPOPPY

*Argemone mexicana* L.

(See Page 197)

This thorny terror of the barefoot boy is an immigrant from Mexico, but it makes itself thoroughly at home as far north as New England. It was brought to the United States as a flower, but promptly broke out of captivity and since has been rated as an escape. Preferring a place where the world goes by, roadsides, old orchards, and meadows that have not been touched by the plow for a long time are its favorite habitats. Its prickly leaves are as sharp-pointed as needles and its stem is covered with "stickers."

The flowers are usually two inches or more broad, with four to six yellow petals and numerous golden stamens. Like other poppies, *Argemone* has no nectar to offer the bees, but it does have plenty of pollen to give them, and they come to it in large numbers. Cross-fertilization is accomplished with the help of the insect visitors. The fruit capsules are nearly an inch long and are well-armed with spines.

## PRIMROSE FAMILY

### *Primulaceae*

This family includes some 400 species, grouped in 28 genera, and is made up of herbs with a wide distribution in the Northern Hemisphere and a limited one in South America and South Africa. Besides the primroses, the shootingstars, and the swampcandle, the family includes some of the loosestrifes and the water pimpernels.

### COMMON SHOOTINGSTAR

*Dodecatheon meadia* L.

(See Page 200)

Growing from eight inches to two feet high, in open woods, on moist cliffs, and upon the broad prairies, the common shootingstar flourishes from Pennsylvania to Manitoba and Texas. It flowers in April and May, its five stamens being united in a cone and its one pistil protruding beyond the cone. Its name comes from *dodeka* (twelve) and *theos* (god). Linnaeus imagined he saw in the flowers of its umbel a little congress of divinities seated around a miniature Olympus.

Each flower is so designed that the bee, clinging to it while sucking nectar, receives on its belly the pollen jarred out of the ends of the cone.

Indian-chief, roosterhead, Johnny-jump, and pride-of-Ohio are some of the vernacular names of the shootingstar.

### SWAMPCANDLE

*Lysimachia terrestris* (L.) B. S. P.

(See Page 200)

The swampcandle, also known as the bulb-bearing loosestrife, were it as efficacious as legend declares, might be used with effect in disarmament. This legend is the basis of its popular name—a loosing of strife. It is said that in ancient times yokes of oxen were rendered gentle and submissive by attaching a loosestrife plant to the tongue of the cart.

It is to be found blooming from July to September in open woodland and along roadsides. It prefers a moist, sandy soil and finds hospitable surroundings in almost the entire eastern half of the United States and Canada. Its yellow flowers are dotted with reddish spots. The slender flower spike is distinctly characteristic, and forms an aggregation of misty yellow color (when a large colony of plants is seen) which is never to be found with other species. Often little elongated bulblets appear at the base of the leaves, and this caused Linnaeus to mistake the plant for a mistletoe that grew on the ground.

## PURSLANE FAMILY

### *Portulacaceae*

This family consists of about 180 species of herbs, generally fleshy or succulent, mostly natives of America. It embraces the fame flower, the taliums, the purslanes, and the portulacas, besides the members shown here.

## BITTERROOT

*Lewisia rediviva* Pursh

Montana State Flower

(See Page 201)

The bitterroot played a part, though a small and inconspicuous one, in that epic of American exploration, the Lewis and Clark Expedition. It was the specimen taken from the herbarium of Meriwether Lewis that was first described by the botanist Pursh and named *Lewisia rediviva*.

The acquisition of a dignified Latin name seems to have been the first forward step in its career; from the simple ornament of the primeval wilderness and friend of the Indian, this blushing beauty has risen to the magnificent position of chosen flower of Montana, the Treasure State, and has given its English name—bitterroot—to a mountain range, a river, and to the famous Bitter Root Valley.

Bitter Root Valley, the depression which separates the Bitter Root Mountains from the Rockies for a distance of about 105 miles, long before the white man penetrated the great West, was a favored spot. The snow melted earliest within its sheltered heart; the storms blew less fiercely over its mountain walls; spring smiled there soonest, the answering smiles seeming to brighten the meadows when the bitterroot held up its colored bowls to catch the sunbeams.

The Indians took a practical interest in the plant, for they knew that its thick, starchy roots could furnish food. When their brown covering is removed and the fleshy part dried, these roots will dissolve in water almost like pure starch, and when heated become a nutritious paste. The value was sufficient to give the plant great importance in the eyes of the savages, and they named the near-by mountains and river after it.

What stirring incidents of pioneer days the bitterroot may have witnessed we do not know. Gradually its old friends, the Selish Indians, were replaced by white settlers, and the lovable flower seems to have had no difficulty in winning the hearts of the newcomers. Meantime mining strikes, boom towns, cow-punchers, and Vigilantes built the generous, romantic, picturesque structure of Montana's early history, which was crowned in 1889 with statehood. It was not until 1895 that the citizens of the Commonwealth found time from developing the abundant resources of the Treasure State to choose a State flower; when they did so, by legislative resolution, they voiced their affection for this eager-faced, native blossom—the bitterroot.

Of course, the habitat of *Lewisia rediviva* is not confined to the valley it has named, nor to the State of Montana. The visitor to Yellowstone may find an occasional specimen, although it is rare within the limits of the park. It is naturally most plentiful in dry, sandy, or gravelly soil, such as may be found along the Bitter Root River.

Nuttall, in 1834, said of it: "This curious plant constitutes a very distinct natural order," and decided that it was most nearly related to the cactus family. He describes the flower as "very large, wholly like that of the cactus, rose-red." Latter-day botanists have classified the bitterroot as allied to the purslane family, *Portulacaceae*. Its resemblance to the gay, garden portulaca, a native of the hot plains of southern Brazil, is apparent; but it is not so easy to connect it with

that persistent weed, the common purslane, which the farmer has condemned by his forceful comparison, "As mean as pusley!"

The bitterroot's relations, poor or otherwise, are of no importance in the eyes of the Montanan, who cares only that it was found rooted in the soil and has made itself inseparable from the history of his wonderful country.

## VIRGINIA SPRINGBEAUTY

*Claytonia virginica* L.

(See Page 201)

Flourishing in moist woods from Nova Scotia to Georgia and from Saskatchewan to Texas, the Virginia springbeauty, with a stem length of 6 to 12 inches, has flowers so delicate that they shrink from the touch of external objects, and yet so hardy that they can make their spring début along with the hepatica, arbutus, and bloodroot. Their early coming has been celebrated in some sections by naming them "Good-morning-spring."

The flowers of the springbeauty are starry blossoms which are turned mostly in one direction. They expand only in the sunshine.

This flower will not waste her sweetness on the desert air for insect pilferers, or blush unseen in the night or in bad weather; she shuts up shop when the sun-loving insects that are her customers seek their retreats at night or in dismal weather, and will not open again until they venture forth to her mart. Thus she saves her nectar and pollen for such as are welcome guests at her board.

Mining and leaf-cutting bees, bumblebees, and numerous species of butterflies are the principal guests, though 71 species of insects have been noticed as visitors. Among these were droves of hive bees, 31 species of two-winged flies, and even the little spotted lady-beetle with a taste for pollen.

The springbeauty has long since put behind her the time when self-fertilization was her method of perpetuating her species. She matures her stamens and offers their pollen to her guests before the stigmas have attained that maturity which makes them susceptible to fertilization.

## RAGWEED FAMILY

*Ambrosiaceae*

A coarse, homely family, with an inviting Greek and Latin name, no one would think of the ragweeds as food for the gods. It consists of 8 genera and about 60 species, mostly native to America. Only a few species are found in the Old World although no tears would be shed if the whole beggarly array of them were to leave our shores forever. The family includes the marsh elders, the clotburs, and the cocklebur, in addition to the several ragweeds.

## GREAT RAGWEED

*Ambrosia trifida* L.

(See Page 201)

The great ragweed is sometimes known as horse-cane and bitterweed. It flourishes from Quebec and Manitoba to Florida and New Mexico. Since its pollen has an irritating effect on the mucous membranes of so many human noses, it has won the name hay-fever weed.





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SWAMPCANDLE  
*Lysimachia terrestris* (L.) B. S. P.  
 PRIMROSE FAMILY  
 (See Page 198)



COMMON SHOOTINGSTAR  
*Dodecatheon meadia* L.  
 PRIMROSE FAMILY  
 (See Page 198)



**GREAT RAGWEED**  
*Ambrosia trifida* L.  
 RAGWEED FAMILY  
 (See Page 199)



**BITTERROOT**  
*Lewisia rediviva* Pursh  
 PURSLANE FAMILY  
 Montana State Flower  
 (See Page 199)



**VIRGINIA SPRINGBEAUTY**  
*Claytonia virginica* L.  
 PURSLANE FAMILY  
 (See Page 199)

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## ROSE FAMILY

*Rosaceae*

The rose family contains a goodly list of herbs, large numbers of shrubs, and quite a few trees, in spite of the fact that the later authorities have taken out of it the apples, cherries, pears, plums, peaches, and other trees. It consists of more than 1,200 species, grouped into some 75 genera. It includes the ninebarks, the meadowsweets, the hardhack, the spireas, the goatsbeard, the Indian-physic, the American ipecac, the queen-of-the-prairie, the cinquefoils, the strawberries, the burnets, the agrimonies, the avens, the raspberries, the dewdrops, the sweetbriars, and the roses. In the development of our fine commercial roses from their wild field forms we have an impressive example of how man, by learning the secrets of Nature, is able to speed up the processes of evolution.

## PASTURE ROSE

*Rosa carolina* L. (*Rosa humilis* Marsh.)

Iowa, North Dakota, Georgia, and New York  
State Flower

(See Page 205)

There is nothing about the simple loveliness of a wild rose to suggest that she is a queen who has never come into her own; yet, as the original from which all the reigning beauties of the rose fancier's garden and the florist's window have been developed, royal honors are her due. She resembles rather a little flower princess too fragile to brave the dangers of rocky hillsides or meadows close to busy highways. However, Nature has provided this seeming innocent with arms for protection and wiles for perpetuation.

The wild roses vie with the violets in the race for recognition as the favorite flowers of States. Georgia has chosen one of them—the Cherokee rose—as her symbol flower, by act of the legislature. North Dakota has, in a similar official way, chosen the wild prairie rose. Iowa has agreed, by common consent, that the wild rose shall be the Hawkeye State's entry in the national floral parade. New York, by the vote of her school children, has also elected the rose to the queenship of the Empire State's floral realm. The pasture rose fits the specifications, so far as the layman is concerned, of all four States.

The choice of the wild rose by four States, as their floral queen, is only one of many tributes to it. English poetry breathes its fragrance in many pretty verses. The scenes of Scott's "Lady of the Lake" are profuse with "wild rose, eglantine, and broom." Yet so elusive is the charm of this blossom's simplicity that it remained for a great American composer to express it most truly in the wistful sweetness of music.

Sharp, downward-turning prickles discourage cattle from eating the foliage and prevent the field mice from climbing the stems to steal the fruit in the autumn, when the hips, or berries, are ripe. These prickles also help the plant to hold its position when it grows on the side of a bank.

The delicate fragrance of the usually solitary, pink blossoms, and the solid center of bright yellow stamens, rich with pollen, attract a variety of insects. Bumblebees, requiring a firmer support than the petals would give, alight directly on the center of the flower, so that pollen from other flowers is likely to reach the pistil. Occasionally self-fertilization takes place in a simply-constructed blossom which yields abundant pollen.

"The wild rose never outstays St. Mary Magdalen" is a fairly true English saying, for her day, July 22, generally ends its season. Each delicate flower has about two days of life. During rainy weather the petals fold over the green stigmas and the yellow stamens to protect them from moisture. The blossom closes with the last rays of daylight and reopens as the sun dispels the darkness, so that only the careful observer and the early riser realize that it "draws the drapery of its couch about it and lies down to pleasant dreams." It is true that some wild roses may be found open at night but these are the ones whose seeds are fertilized and whose pollen is carried off, so that rain and dew are no longer to be feared.

The bright red "hips" have a pleasant flavor, but hairs within them irritate the throat, and to-day they are left for wild things to eat. Old writers refer to them as highly esteemed delicacies. "Children with great delight eat the berries thereof when they are ripe, and make chaines and other pretty geegaws of the fruit; cookes and gentlewomen make tarts and suchlike dishes for pleasure," testifies one. We are rich enough in more luscious fruit to-day to forego this doubtful dainty. The "hip" is designed to tempt the birds, which sometimes drop the seeds it contains miles away from the mother plant.

Large swellings or galls are frequently found on the rosebush. Robin's cushions, the country people call them, although they have nothing to relate them to the robin except a somewhat reddish color. Their origin is found in a kind of wasp—the rose gall—which punctures a bud and lays its eggs inside. Numerous larvae are hatched and later creep into the leaf tissue, while the bud swells into a gall. The taste of these objects is sufficiently unpleasant to have gained for them a reputation for medicinal virtue in earlier days.

## VIRGINIA STRAWBERRY

*Fragaria virginiana* Duchesne

(See Page 208)

Those who have not gone out into the open woodlands and gathered wild strawberries, as toothsome as they are beautiful, have missed one of the charming experiences of life in the country. The plant's white, loosely-clustered flowers; its oval, saw-edged, green leaflets, and its glistening red berries make a combination that delights the eye of the most unsentimental. "Doubtless God could have made a better berry, but doubtless He never did," declared that patient fisherman, Izaak Walton, who was also a connoisseur of things to eat. And whoever has tasted a strawberry that represents the last word of the plant breeders' art, and then the strawberry of the open woodland, will agree that cultivation has added nothing to flavor, however much it has added to size. The Duke of Gloucester, who became Richard III, had a weakness for wild strawberries. It is said that in 1483, as certain great lords were sitting in counsel arranging for his coronation, the Duke came in and, "saluting courteously, said to the Bishop of Ely: 'My lord, you have verie good strawberries in your garden in Holborne; I require you to let me have a mese of them.'"

It is said that during the reign of Henry VIII the price of strawberries was eight cents a bushel.

The favorite haunts of the Virginia strawberry are in dry fields, along roadsides, and in open woodlands. It flourishes from Nova Scotia to the



Gulf of Mexico and has secured a foothold as far west as the Dakotas.

The berry of the strawberry is a false fruit. It is the tiny pincushion-like receptacle of the strawberry flower that fleshens and reddens into the fruit.

The strawberry sends out many children in the shape of runners. These tiny runners take root in the ground, and as soon as they get a firm foothold, the connecting stem promptly wilts and the baby strawberry plant is set loose to fight its own battle in the world. How prolific this strawberry plant may be is strikingly shown by an experiment made some years ago. One plant in three years developed 200 plants, which covered more than 70 times as much ground as the progenitor of the family.

Many people regard strawberries as the most healthful of fruits. It was the firm conviction of Linnaeus that they cured his gout, while others have found them beneficial in fevers and bilious disorders. They are said to have a very excellent effect upon the teeth by dissolving tartar.

### FLOWERING RASPBERRY

*Rubus odoratus* L.

(See Page 204)

Growing in rocky woodlands, dells, and shady roadsides, flowering from June to August, and claiming as its own a territory reaching from northern Canada to southern Georgia and from the Atlantic to Michigan and Tennessee, the flowering raspberry has a beauty all its own; yet so closely does it resemble the wild rose that many confound it with this flower, although a glance at the undivided leaves would correct such an error. While it is sometimes called the purple flowering raspberry, it is quite incapable of producing a true purple flower. At first its color is deep crimson-pink, which finally fades to an unattractive magenta-pink. The large leaves are three- to five-lobed and a trifle hairy. The fruit is tart and resembles a flat, red raspberry. Some people call it the thimble-berry.

The leaves of the flowering raspberry are rather large and children often fold the lower ones, which sometimes measure a foot across, and make drinking cups of them.

This flower is the "poor relation" of the exquisite wild rose; yet even at that, when its bright blossoms burst forth in rich confusion at the edge of the woods, it lends enchantment to the scene.

### HARDHACK

*Spiraea tomentosa* L.

(See Page 205)

The hardhack, or steeple-bush, is one of the most cheery of the pink-and-magenta flowers of the roadside, ditch, and swamp, blooming from July to September.

Living in territory where competition for insect favor is always fierce and the battle of the blossoms a lively one, the hardhack arrays itself in a remarkable cluster of delicate florets at the top of a two- or three-foot stem, which, in the swaying breezes, waves welcome to the insect hordes.

And that it receives its share of the business of bee and butterfly is evident to any one who will stop to count the shoppers who visit this

floral department store. The bees and the butterflies are welcomed, but the plebeian ants are frowned upon and given a chilly reception. Most of the hardhack's trade is in pollen, as its supply of nectar is somewhat limited.

Being a dweller in damp soil, the hardhack has had to take precautions to protect itself from colds. If the under side of its leaves were not covered with woolly hairs, the vapors rising from the ground would clog their pores and interfere with their breathing. Behind the shelter of this smooth coat of vegetable fur the plant can resist changes in the weather and degrees of moisture that otherwise would be injurious, if not fatal.

Many other flowers wear their coats on the top of the leaves rather than underneath. They are usually flowers that grow out in the open and get the full benefit of the noonday sun; they would die of thirst if they did not have some way to check the process of transpiration when subjected to undue heat; hence this coat of furs.

The distribution of the hardhack is rather wide, reaching from Nova Scotia to Georgia and Kansas. It has so arranged its domestic economy that in the event the insects fail to bring it pollen from other flowers it can use its own for purpose of reproduction.

### AMERICAN BURNET

*Sanguisorba canadensis* L.

(See Page 208)

The American burnet, which flourishes in low meadows from Newfoundland to Michigan and southward to Georgia, growing from one to six feet high, blossoms from July to Jack Frost time.

The Latin name of the burnet genus, *Sanguisorba*, comes from *sanguis* (blood) and *sorbere* (to absorb), and refers to styptic properties employed in the checking of bleeding in folk medicine.

### PURPLE AVENS

*Geum rivale* L.

(See Page 217)

This graceful plant, with its nodding, bell-shaped blossoms, also belongs to the rose family.

From Newfoundland and Saskatchewan to New Jersey and Colorado, this species seeks low, wet ground, where it thrives in surroundings that are too damp for most flowers.

So sweet is the purple avens' honey cup that the bumblebee will often desert his favorite flowers for it, and very frequently grows so impatient for the flower's opening that he eats through the sepals in order to steal the sweets.

The purple avens' flowers nod their heads to keep the dew and rain from filling their cups and drowning their pollen.

### RUE FAMILY

*Rutaceae*

The rue family, of which the orange and the lemon are imported species of the genus *Citrus*, consists of about 110 genera and 950 species. The prickly-ash, and the common hoptree are also representatives of the family. The common rue, a native of Europe, has escaped from cultivation in several localities in our range.



FLOWERING RASPBERRY  
*Rubus odoratus* L.  
ROSE FAMILY  
(See Page 203)

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PASTURE ROSE

*Rosa carolina* L. (*Rosa humilis* Marsh.)

ROSE FAMILY

Iowa, North Dakota, Georgia, and New York State Flower  
(See Page 202)



HARDHACK

*Spiraea tomentosa* L.

ROSE FAMILY

(See Page 203)



## ORANGE BLOSSOM

*Citrus sinensis* Osbeck

Florida State Flower

(See Page 217)

Who that has seen loved ones given in marriage, with the orange blossoms lending the touch of their beauty to the bride, can help but sympathize with the sentiments of Florida's legislators when they enacted into law the State's affection for the flower of its favorite fruit? And while the orange blossom is admired and honored by its association with the bridal hour, the fruit is known wherever men and women who love good things to eat foregather.

While the orange is not native to America, being in reality a comparatively recent immigrant, there are more orange trees in the United States than any other part of the world. Nineteen million trees were growing in this country in 1920, one for every six people. Of these, Florida had nearly six million while most of the others were in California.

The orange appears to have originated in China and the Burmese Peninsula. Thence it was carried to India and Hindustan. There the Arabs met it, fancied it, and gave it a footing in Mesopotamia, at the beginning of the tenth century. From Asia it was introduced into northern Africa and Spain, traveling with the conquering armies of Islam. It journeyed with the Spaniards from Europe to South America, where the navel variety was found by missionaries from this country, who sent some trees to Florida and California. These took root, thrived, and straightway the American orange became one of our chief fruit crops.

In favorable seasons and in well-kept groves, trees bear from 400 to 1,000 oranges each. Being slow in reaching maturity, they are slow also in giving up their privilege of producing their golden fruit. Carefully tended trees usually yield for fifty years, and some are productive for eighty years. Occasionally a sturdy centenarian is found bearing fruit in abundance; but so great has been the improvement of the orange under modern methods of plant-breeding that the product of these hardy, old trees seems bitter and unpalatable, although it may have delighted ten thousand feasters in its day.

Those who have not been privileged to visit an orangery and there taste the Nature-ripened fruit in all its golden lusciousness cannot know fully how delicious an orange may be. The orange that goes to market and must wait weeks before it can get out of the hands of the retailer and into those of the consumer is often packed before it is ripe, and few fruits gathered unripe can ever be as delicious as those which have hung on the spit of the twig and been toasted to a proper flavor before the sun.

The orange tree is an evergreen, and cultivated varieties seldom exceed 30 feet in height. Blossoms, green oranges, and ripe fruit are often seen on the same tree, but usually the trees bloom in the spring and ripen their fruit in the fall. The oily, acrid peel of the orange is an effective means which Nature employs to seal up her packages of fruit. The germ or the insect that could break through a healthy orange skin would be a brave and persistent creature.

## RUSH FAMILY

*Juncaceae*

The rush family consists of perennial, and a few annual, grass-like, usually tufted, herbs, which usually have moist lands as their habitat. It is composed of 8 genera, subdivided into some 300 species, which are widely distributed. The flowers are lily-like in structure but sedge-like in appearance and texture.

## COMMON WOODRUSH

*Juncoides campestris* (L.) Ktze.

(See Page 218)

This species of rush occurs in woodlands throughout the United States and Canada, and is also indigenous to Asia and Europe. It bears many common names, among them, sweeps, chimney-sweeps, black-caps, cuckoo-grass, and good-Friday. This species is fairly typical of the whole family, except that some of the others do not have tufted stalks.

## ST. JOHNSWORT FAMILY

*Hypericaceae*

This family is a rather small one, consisting of about 10 genera and some 300 species, but it has a wide geographic distribution throughout the temperate and warm regions of the earth. Most species are herbs, though there are some that have become shrubs, and a few in tropical countries that have reached the stature and permanence of trees. The family name is derived from the legend that blood-like spots appeared on its leaves immediately after St. John was beheaded, and that these spots continue to appear on the anniversaries of his martyrdom.

## COMMON ST. JOHNSWORT

*Hypericum perforatum* L.

(See Page 218)

A cosmopolite, which came out of Asia with the races that marched westward, the common St. Johnswort has made Europe and America its own, except in the high latitudes where Jack Frost comes too early and stays too late for its well-being. Fields, waste lands, and roadsides are all to its liking in the matter of environment and it flowers from June to September, growing from one to two feet high.

The St. Johnswort is hard to extirpate. Its rank, rapid growth is highly exhausting to the soil, and this, of course, makes it a most undesirable alien.

Usually possessing sterile shoots about its base, the plant may be seen maturing seed capsules on some branches while there are groups of withered flowers, fresh flowers, and even buds on others. Under these conditions it is usually an unkempt, untidy-looking herb.

Secreting no nectar, the St. Johnswort appeals only to the pollen gatherers, and accomplishes cross-fertilization by that attraction alone.

Few flowers have gathered such a cluster of superstitions about them as this immigrant.

Gathered upon a Friday, in the hour when Jupiter comes to his operation, and hung upon the neck, it helps mightily to drive away all fantastical spirits, the peasants of Europe believe, and in accordance with that belief they hang it in the windows of their cottages on St. John's

Eve to avert the "evil eye" and break the spells of the spirits of darkness. Girls believe that its leaves will decide whether or not the coming year will make them brides, and therefore if it flourishes when they plant it they consider its prosperity a happy augury for their future. In early times poets and physicians alike extolled its virtues, and an ointment made from it brought it the name "balm-of-the-warrior's wound." It was also considered an efficacious remedy for melancholia.

Live stock learn to give the St. Johnswort a wide berth, as it is poisonous to them.

### GOLDEN ST. JOHNSWORT

*Hypericum aureum* Bartr.

(See Page 218)

There is no member of the St. Johnswort family with a better claim to beauty than the subject of this sketch. With its drooping petals, its host of stamens, and its united pistils, the blossom of the golden St. Johnswort is admittedly a beautiful flower. This species flourishes in the southern and western States.

The plant is a shrub that attains a height of three feet, more woody than most species of St. Johnswort, and often presenting a globular shape, like a miniature tree. It has a red bark that gradually peels off in thin layers. In its wild state it prefers rocky situations and shady spots where moisture is longest retained, and under cultivation grows from cuttings or from seeds, the seed-grown plants blooming the second year.

### SAXIFRAGE FAMILY

*Saxifragaceae*

Closely related to the rose family, but differing therefrom in having albumen in its seeds, and in possessing opposite as well as alternate leaves, the saxifrage family consists of some 90 genera and 650 species. It is widely distributed throughout the Temperate Zones, but is rare in the Tropics. "Rock breaker" is the meaning of its Latin name, derived from the fact that many saxifrages grow among the rocks, which are often shattered by the growth of the roots.

Included in the family are the several saxifrages, the foamflower or false miterwort, the alumroots, the bishopscap, and the coralbells.

Gray includes the members of the grass-of-Parnassus family, those of the gooseberry family, and those of the hydrangea family, in the saxifrage family.

### CORALBELLS

*Heuchera sanguinea* Engelm.

(See Page 219)

The coralbells belong to the genus *Heuchera*, of the saxifrage family. It very closely resembles its cousin *Heuchera americana*, the alumroot, which is the type species of the genus. Most of the species of *Heuchera* are essentially Mississippi Valley plants, although a few of them are found on the Atlantic seaboard. The flowering time of the coralbells and the other members of this genus is May and June.

### SEDGE FAMILY

*Cyperaceae*

The sedge family is cosmopolitan in its distribution and large in the number of species it contains, there being some 3,200 of these, grouped into

approximately 75 genera. From the sedges the Egyptians made the papyrus upon which they kept their records; they also made cordage and sails from them, and used sedge roots as fuel. The family includes, among others, the flat-sedges, the spike rushes, the cotton grasses, the club rushes, the bulrushes, the umbrella-sedges, the beaked-rushes, the bald-rushes, the nut rushes, and the sedges.

### FRASER SEDGE

*Carex fraseri* Andr.

(See Page 219)

This species of sedge is found in the Middle Atlantic seaboard States. It is a perennial with short rootstocks and flattened culms. Its seeds ripen from May to July. In such a large family, with foliage ranging from narrow threads to broad blades, and heads from spikes bearing only a few seeds to those resembling wheat, it would be hard to pick a typical species, but this sedge will give one a fair idea of that large group of plants.

### SENNA FAMILY

*Caesalpinaceae*

The senna family embraces about 90 genera subdivided into approximately 1,000 species. It comprises a group of herbs, shrubs, and trees that are mainly tropical in their distribution. The redbud is our most admired member of this family. Other members are the wild senna, the coffee senna, the honeylocust or honey-shucks, the waterlocust, and the Kentucky coffeetree.

From the South American species of senna trees comes sapan-, brazil-, and other redwoods. The divi-divi, still another species, produces an astringent bean rich in tannin, the juices of which are widely used in calico-printing for blacks and dark shades. Brazil got its name from the Brazil tree, from which come the two active dye principles, brasilin and brasilein, producing pink, purple, and crimson. These dyes are not tub-proof, however. The famous bird-of-paradise-flowers of Mexico and our own Southwest belong to the senna family.

### PARTRIDGE PEA

*Chamaecrista fasciculata* (Michx.) Greene

(See Page 220)

The partridge pea, locally known as the large-flowered sensitive pea, dwarf-cassia, and magoty-boy-bean, flourishes in dry soil from Massachusetts to Florida and westward to Minnesota and Mexico. It is an annual, sometimes spreading and sometimes erect, and flowers from July to September. Its behavior and appearance both remind one of the sensitiveplant of the mimosa family described on page 157. This is another instance of evolution along parallel lines in different families of plants.

### SMILAX FAMILY

*Smilacaceae*

By some botanists the smilaxes are classed with the lily family, but the National Herbarium and other more recent authorities take them away from the lilies and give them a family status of their own. The family thus constituted consists of 3 genera and about 200 species, distributed in the warm and temperate regions of the earth. Only a dozen species of a single genus are found in North America. These include the carrionflower, the



AMERICAN BURNET  
*Sanguisorba canadensis* L.  
 ROSE FAMILY  
 (See Page 203)



VIRGINIA STRAWBERRY  
*Fragaria virginiana* Duchesne  
 ROSE FAMILY  
 (See Page 203)



halberdleaf smilax, the upright smilax, the several greenbriers, the horsebrier, and the catbrier.

The smilaxes used by florists for decorative purposes do not belong to the smilax family, but to the same family as asparagus.

### CARRIONFLOWER

*Smilax herbacea* L.

(See Page 220)

The carrionflower has a range that reaches from New Brunswick to Manitoba and from Florida to Nebraska. Its flowering season is from April to June and its preferred environment, woods and thickets. As its unsavory name is matched by a disgusting odor, the bees give it a wide berth and flies are called in to serve as its messengers. Attar of roses seems no more pleasing to the human odor sense than the carrionflower to that of its fly friends. John Burroughs declared it smells like the vent of a charnel house, and Thoreau compared it to dead rats.

Happily the carrionflower does not keep up its evil ways to the end of its time. Having made a virtue of necessity by fitting itself to entertain the little green flesh flies, as soon as it sets seed it throws off its evil nature, and, dressing up anew, in resplendent autumn tints, offers fine little bunches of small, bluish black berries to the birds. Here again it has method in its madness, for these birds carry its seeds to other points and thus enable it to colonize in new localities.

### BLUELEAF GREENBRIER

*Smilax glauca* Walt.

(See Page 221)

Commonly known by such names as saw brier, false sarsaparilla, and erroneously as bull bay, the blueleaf greenbrier sometimes is confused with the catbrier.

It may be found from Maine to Florida and as far west as Texas. Gregarious in its tastes, it grows in thickets, where it adds much to the impenetrability of the brushy mass. The plant is a persistent climber, with many irregular branchlets, and with tendrils of astonishing strength.

The vine is woody, but usually is armed with slender prickles that make up in sharpness what they lack in sturdiness. In the summer, the leaves are a bluish green with a waxy bloom on their under surfaces. They are beautifully crimsoned by the cold of the late fall. The berries are black, each having two or three seeds.

### ROUNDLEAF GREENBRIER

*Smilax rotundifolia* L.

(See Page 221)

The common names of this brier are as numerous and as varied in their etymology as its relatives are numerous and varied in their attributes. Bamboo-brier, bread-and-butter, rough-bindweed, wait-a-bit, dog-brier, biscuit-leaf, and devil's-hop-vine are some of its pseudonyms.

It is so widely known that it figures in the geography of the eastern section of the United States, lending its name to mountains, rivers, counties, and summer resorts.

The roundleaf greenbrier is a great climber, its tough tendrils laying hold upon any object in their path. It possesses all the attributes of a barbed wire fence, and woe betide the tres-

passer within its precincts. Its prickles are so sharp and so hard to break away from that most of the creatures which disturb birds' nests, built among them for protection, give them a wide berth.

The leaves of the greenbrier are usually heart-shaped, or nearly round, with a puckered appearance. About the last in the thicket to fall, the mottled foliage of the frost-painted greenbrier still flutters in the breeze long after the woods are brown and bare. The flowers come from April to June, but they are insignificant little blossoms which invite countless flies to their board rather than gaudy-winged butterflies and long-tongued bees.

### SPIDERWORT FAMILY

*Commelinaceae*

The spiderwort family has about 25 genera and some 350 species, most of them of tropical origin. Only a few spiderworts have had the courage to invade the dominions of Jack Frost. The day-flowers and the spiderworts are our only representatives of the family. A species of South American origin is known as the wandering-jew.

### COMMON DAYFLOWER

*Commelina communis* L.

(See Page 222)

The common dayflower, loving moist, shady ground, has established itself as a Pan-American blossom. Its range is from southern New York down through tropical America all the way to Paraguay. Its delicate blue flowers win admiration alike from man and bee. The dayflower is an early riser, with blossom open and latching out as soon as the bees begin to stir. By noon they have searched it out, gathered its pollen, sipped of its nectar, and paid its toll of fertilization. As soon as this has been done, its lovely petals roll up and wilt into a wet and shapeless mass, never to open again.

The Latin name of this species, *Commelina*, was given it by Linnaeus, the great Swedish botanist. He had three friends, the Dutch botanists Commelyn. Two of the brothers were active and persistent in their work and published the results of their investigations. The third brother, Kaspar, was a deep student, but lacked the energy required in the publication of scientific work. Noting the three petals on the blossom of the dayflower, the two of them bright, conspicuous, and attractive, and the third lacking in all those qualities, he named the flower after the brothers to typify their work in life, and the name will doubtless go down to the end of time to remind the world of the lack of ambition and application of Kaspar Commelyn and the energy of his brothers. Kaspar never lived to read the little joke in print, for he died in 1731, before "Species Plantarum" appeared.

### VIRGINIA SPIDERWORT

*Tradescantia virginiana* L.

(See Page 223)

The Virginia spiderwort, which is a cousin of the wandering-jew and the Virginia dayflower, rejoices in the lachrymose, everyday name of widow's tears.

Like its cousin, the dayflower, the spiderwort opens for only a brief time—the morning hours. Then the flowers are bright and lively enough for any company, but as the sun sweeps down the westward sky the petals begin to retreat into the calyx, and presently there is a thin jelly where a while ago

there was a flower. "Dissolved in tears," one might say, was the fate of the morning's blue petals surrounding the golden anthers.

The Virginia spiderwort is cross-fertilized by the bumblebees, which are attracted by an abundance of pollen. Bumblebees seem to be attracted by blue and purplish flowers as strongly as bargain hunters are drawn to the red trimmings of ten-cent stores.

The botanical name of the Virginia spiderwort is in memory of John Tradescant, gardener to Charles I. A relative sent him some spiderwort seeds which he planted at Hampton Court. Since that time this species has been a well-known garden flower in England.

The range of this flower extends from Maine to South Carolina and westward to the Rocky Mountains. Its habitat is rich, moist ground.

### SPURGE FAMILY

#### *Euphorbiaceae*

The spurge family consists of approximately 250 genera subdivided into some 4,000 species, and has a wide geographical distribution. The various species take the form of herbs, shrubs, and trees, and some of them have a tremendous economic significance. The trees which give the world its rubber belong mainly to this family. The tuberous root of the manioc or cassava produces a fine, rich starch. Castor oil comes from the seeds of *Ricinus communis*, and croton oil from plants of the genus *Croton*. Resins are obtained from several species. The South African toxicodendron is one of the most poisonous plants known. The candlenut seeds are produced by spurge trees. African teakwood also is gathered from trees of this group.

The crotons, the mercuries, the tragias, the castor-bean, the queen's delight, the wild ipecac, and the poinsettias are all members of the family. It is an interesting fact that no member of the spurge clan bears flowers that have both stamens and pistils. All spurge flowers are either male or female. In some species both staminate and pistillate flowers occur on the same plant. In others a given plant bears only the one or the other.

### SNOW-ON-THE-MOUNTAIN

#### *Euphorbia marginata* Pursh

(See Page 223)

The snow-on-the-mountain ranges from Minnesota to Colorado, in dry soil. It has been introduced into the Central and Atlantic States, where it thrives in waste places, from May to October, growing to a height of three feet.

The closest relatives are the seaside spurge, the milkpurslane, the copperleaf, the wartweed, and the mole-plant, the last two having been introduced from Europe.

### STAFFTREE FAMILY

#### *Celastraceae*

This family consists of trees, shrubs, and climbing woody vines, with about 45 genera and 375 species, of wide distribution in warm and tropical regions. It includes the strawberry bushes, the burning bush or wahoo, the spindle-tree, the mountain lover, and the American bittersweet.

### AMERICAN BITTERSWEET

#### *Celastrus scandens* L.

(See Page 224)

A member of the stafftree family, the American bittersweet is less a tree and more a vine, with numerous common names, including climbing orange-root. The fruit, which is a capsule and not a berry, bursts in the frosty days of fall, and, crinkling back, thrusts forward the bright scarlet arils inclosing the seeds.

Not content to twine itself around other vegetation, this vine often outdoes the kitten that plays with its own tail, twisting its own stems together, frequently into a rope of great strength. It does not cling like the friendly ivy, but, with the constricting power of the python, it winds and twines about a sapling with such persistent strength that the young tree is often killed.

The range of the American bittersweet is from eastern Canada to South Dakota and from North Carolina to New Mexico, the shrub being especially abundant in the Middle West. The flowers put in their appearance in June. They are creamy white, small, inconspicuous, and scentless. The berry-like capsules reach their full development in September. They remain on the stems all winter, unless eaten by the birds. If gathered and dried on the branches before frost, they become hard and durable and will retain the bright freshness of their coloring for several years.

If one may judge from the use made of this plant by the primitive Indians, it has a right to be called the stafftree. When their little patches of maize and other crops failed and famine threatened, the red men resorted to the use of the American bittersweet.

### SUNDEW FAMILY

#### *Droseraceae*

The sundew family is a race of insectivorous plants made up of 4 genera and approximately 90 species. Most species are bog dwellers, but some of them are found on sand plains. Some of them have leaves coated with a sticky, natural mucilage designed to attract and hold captive the insects that come their way. The common sundew possesses stalked glands, which also function as tentacles, bending over to secure their prey.

### VENUS FLYTRAP

#### *Dionaea muscipula* Ellis

(See Page 224)

Charles Darwin once wrote that he considered the Venus flytrap "the most wonderful plant in the world," and anyone who studies its behavior will doubtless agree fully with his verdict. It is found on the coast of the Carolinas in very limited areas. The edges of the leaves bear a series of little spikes, and the slightly concave surface of each leaf half bears three or more fine, tapering bristles, hair triggers, as it were, to set off the trap. Touch one of these hair triggers twice or two of them once, and immediately the leaf closes, the spikes at the two edges interlace, and you will see how the plant takes and retains its prisoners.

The trap is baited with sweets that are especially tempting to insects. When they spring it and are caught they are held lightly for the time being, as if the flytrap were debating the edibility of the catch. If the prisoner be too small for a good morsel, or a bit of nonnutritive matter, the trap

will open and the prisoner be released. But if it be edible and nutritious, the trap closes down so rigidly that one can see the impression of its body through the leaf. Struggling to escape boots the prisoner nothing, for the harder the struggle the tighter the flytrap's hold.

The leaf secretes a digestive ferment, and with this it breaks up and absorbs the tissues of the erstwhile unwilling guest. When only the chitinous parts remain the leaf opens up again, casts out the "bones" of its feast, and sets its trap for the next victim.

If, as before intimated, the victim seems too small to satisfy the leaf's appetite, it will open, and allow the prisoner to escape, for it might miss a substantial meal while digesting this little creature, and that the plant seems never willing to do.

## TOUCH-ME-NOT FAMILY

### *Impatiéntaceæ*

This family consists of a single genus of some 220 species, and one monotypic species outside of this genus. The touch-me-nots are mostly natives of Asia.

### PALE SNAPWEED

#### *Impatiens pallida* Nutt.

(See Page 225)

Though somewhat rarer than its close relative, the spotted snapweed or spotted touch-me-not, the pale snapweed, also known as jewelweed and pale touch-me-not, is a common plant of wet and shady situation in the northern part of the eastern United States. It reaches as far south as Georgia. Its flower is somewhat bell-shaped, almost as broad as long. It develops its stamens first and its pistil afterward, so that self-fertilization is almost impossible and cross-fertilization, a usual thing. Late in the season, after the brilliant jewel-like flowers have gone, inconspicuous blossoms appear which fertilize in the bud and are called cleistogamous flowers. It thus becomes, in a measure, independent of its insect guests for fertilization; but, realizing that degeneracy often follows close inbreeding among plants as well as animals, it tries to have as many seeds set by cross-fertilization as possible. It is a curious fact that in England, where there are no humming-birds, the native snapweed, nineteen times out of twenty, produces cleistogamous flowers instead of showy blossoms, and that even when producing the showy blossoms these seldom set seed. Many botanists have wondered whether this does not look like a determination on the part of the plant to secure a firm foothold in its new environment before expending its energies on flowers which, though radiant and attractive, are quite dependent on outside facilities for fertilization and perpetuation.

## TEASEL FAMILY

### *Dipsacaceæ*

The teasel family consists of 7 genera and about 140 species, all natives of the Old World. It includes the common teasel, the Fullers teasel, the field scabiosa, and the southern scabiosa, all immigrants from Europe.

### TEASEL

#### *Dipsacus sylvestris* Huds.

(See Page 226)

The chief distinction of this species is the fact that it is the parent of the cultivated teasel so widely used in raising the nap on various woolen

cloths. The wild species have straight prickles on the heads and are therefore valueless in cloth-finish; the cultivated teasel has hooked prickles.

The heads of the cultivated variety are fixed around a long cylinder, or roll, which is made to revolve against the surface of the cloth. The hooks of the prickles take hold as they turn and raise the nap. No mechanism has yet been devised that can take the place of the teasel bracts, with their combined rigidity and elasticity. They are strong enough to nap the cloth, but too weak to tear it.

The leaves grow out from the teasel stem in such a way that they form little cups at their base. These collect dew and rain, the water serving to keep ants and other creeping creatures from reaching the flowers, in the same way that tin disks on hawthers keep rats from passing between ships and docks.

Each tiny floret on the teasel's head consists of a long tubular corolla made up of four petals grown together. The exposed parts of these petals are pale lilac; the lower parts are white and almost hidden.

On the first day of the floret's life its four anthers show and shed pollen. On the second day these wither and the pistil comes to maturity.

The spiky nature of the teasel's head prevents insects from walking over it. Therefore they must dive headforemost into the tubes if they want the honey these have to offer. Thus they always carry pollen from the flowers with mature stamens to those with mature pistils.

The teasel blossoms from July to September over a range that reaches from Maine and Ontario to Virginia and the Mississippi River. It prefers roadsides and waste places.

## VALERIAN FAMILY

### *Valerianaceæ*

This family consists of about 9 genera and some 300 species, of wide distribution, but most abundant in the Northern Hemisphere. One species, the edible valerian, has carrot-like roots which are eaten by our western Indians either raw or dried. Sometimes the roots are ground into flour from which bread or mush is made. Under the name of nard the eastern nations use some species as a substitute for spikenard in their scented baths. The several cornsalads are members of this family.

### COMMON VALERIAN

#### *Valeriana officinalis* L.

(See Page 226)

The common valerian is an escape from gardens in some of the eastern States, and is found along roadsides. It is a native of Europe and Asia, and an immigrant to America. Some of its old names are cats'-valerian, setwell, cut-heal, all-heal, garden-heliotrope, and St. George's-herb. Its flowering season is from June to August.

## VERVAIN FAMILY

### *Verbenaceæ*

This family consists of herbs, shrubs, and tropical trees, with about 75 genera and 1,300 species, which have a wide geographic distribution in temperate and tropic lands.

Some of the tropical trees of the family yield the best ship timbers known in marine construction. The wood is moderately hard, very durable, strong-



ly scented, and possesses a dark golden-yellow color, turning to brown and approaching black with age. The verbenas, the vervains, and the fog-fruits belong to this family.

### BLUE VERVAIN

*Verbena hastata* L.

(See Page 227)

Growing from four to six feet tall, with its flowering spikes branching upward like the arms of a candelabra, the blue vervain, whose flowers are more purple-and-violet than blue, possesses a range as wide as any other plant species in America, almost the entire United States and Canada being home soil to it. Wild hyssop and simpler's joy are other names for it.

One always regrets that *Verbena hastata* has a way of maturing the blossoms on each spike a few at a time instead of all at once, for seeds at the bottom of the spike, flowers in the middle, and buds at the top do not produce the pretty effect that a spike full of flowers would. The late John Burroughs, who could always be relied on to find beauty in any flower that possessed a trace of it, wrote of its drooping, knotty threads as making "pretty etching upon the winter snow."

The blue vervain is a favorite with the bumblebees, which, with many other members of the bee family and the bee-like fly species, gather at its festal board.

It borrowed its name, simpler's joy, from a European sister, and has also appropriated many of the latter's traditions and much of its folklore. No plant that the herb gatherer could find was more marketable than the vervain; hence none brought so much joy to the simple peasant.

The vervain is known abroad as the holy herb, and was one of the plants sacred to the Druids of England. Likewise, it was held sacred to Thor, the God of Thunder, and was supposed to exert a peculiar influence upon the eyesight. It is said to have been found growing on Mt. Calvary, and is reputed, in the folklore of Europe, to stimulate affection and to be able to break the power of witches.

### VIOLET FAMILY

*Violaceae*

The violet family consists of about 15 genera and 300 species, of wide distribution. In the United States all but a few species belong to the genus *Viola*. The green violet of the genus *Cubeolum* and the nodding violet of the genus *Calceolaria* are the principal exceptions to the rule that American violets belong to the genus *Viola*.

### VIOLET

*Genus Viola*

Illinois, Rhode Island, Wisconsin, and New Jersey State Flower.

(See Page 227)

While the wild roses share with the violet the honor of being the State flowers of four American Commonwealths, the violets have had a slight advantage in that they can claim legislative recognition by three States, where the wild roses have the legislative award of only two. Illinois, Wisconsin, and New Jersey chose the violet by legislative action and Rhode Island, by the vote of her school children.

### WATERLEAF FAMILY

*Hydrophyllaceae*

This family of herbs and shrubs, mostly native of western North America, consists of about 17 genera and 175 species. The name comes from the supposition of the Greeks that each leaf contains a cavity for water. The phacelias, the namas, the nemophilas, and nycteas belong to the family.

### VIRGINIA WATERLEAF

*Hydrophyllum virginianum* L.

(See Page 228)

The Virginia waterleaf, sometimes known as the brook-flower, lives in woodlands from Quebec and Manitoba to South Dakota, Kansas, and South Carolina. It is, perhaps, the representative eastern species of the family.

### WATERLILY FAMILY

*Nymphaeaceae*

This family consists of 5 genera and about 45 species, living in fresh water and distributed widely. The various species generally are large, floating plants, with stems that form subterranean creepingshoots. The flowers in most waterlilies are very large, in the case of the celebrated *Victoria regia* reaching a circumference of more than four feet. The leaves of this regal species are often seven feet in diameter. The waterlilies afford the best illustration of the evolution of blossoms we have in the world to-day. In the several species of the family we may see sepals being transformed into petals and petals into stamens; the transition is so gradual and insensible that many intermediate bodies are neither petals nor stamens, but partly both.

Waterlily lore goes back to the earliest literature. Pliny tells us that they were considered an antidote for love philters even in his time, and the lotus of Egypt and that of India have figured much in the history of great empires and imposing civilizations.

### SMALL SPATTERDOCK

*Nymphaea microphylla* Pers.

(See Page 228)

Flourishing from New Brunswick to Pennsylvania and westward to Minnesota, this spatterdock flowers in midsummer, with ponds and sluggish streams as its favorite habitats.

The spatterdocks frequently join with the pickerelweeds in making a floral fringe along the banks of slow streams or the shores of lakes and ponds, so that boating is difficult.

### AMERICAN WATERLILY

*Castalia odorata* (Dryand.) Woodv. & Wood

(See Page 229)

This beautiful inhabitant of ponds and streams, sometimes known as the sweet-scented white waterlily, has a range reaching from Nova Scotia to the Gulf of Mexico and from the Atlantic Ocean to the Mississippi River. Its preferred habitat is still water, such as ponds, shallow lakes, and slow streams. It begins flowering in June and continues to put forth blossoms until touched by frost.

Its leaves, dark green above, pinkish on the under side, and somewhat heart-shaped, float on the water. The solitary flower, pure white or pink-

tinged, deliciously fragrant, and often five inches in diameter, opens shortly after sunrise, spreading a bounteous feast for bees, flower flies, beetles, and "skippers."

This blossom affords a striking picture of one phase of plant evolution. As the ages passed, the waterlily found that it pays to advertise. What good were its numerous pollen-producing stamens if the insects failed to come and carry away the pollen to fertilize other flowers? Therefore many of the stamens were gradually transformed into petals, through natural processes, with the result that now, having intelligence of its wares published to the four winds, no pollen-dispensing establishment is busier than the American waterlily when the insect hosts are awing.

The stamens and pistils of the American waterlily mature at different times, thus insuring cross-fertilization.

### AMERICAN LOTUS

*Nelumbo lutea* (Willd.) Pers.

(See Page 230)

This species, sometimes known as the water-chinkapin, sometimes as duck-acorn, and sometimes as the wankapin, lives in rivers and lakes from Massachusetts to Cuba and from Minnesota to Louisiana. The tubers and seeds are farinaceous and edible. It is a close relative of the Hindu lotus, which serves many useful purposes in the East. The filaments of the Hindu species are deemed astringent and cooling, and are used in the treatment of burns; the leaves are eaten as bed sheets for fever patients; a sherbet made from it is given to smallpox patients as a refrigerant; the rhizomes, stalks, and seeds are eaten by the Hindus; the Chinese prepare Chinese arrowroot from its rootstocks, and the wicks for the Hindu temple lamps are prepared from the fibers of its stalks.

### WOODSORREL FAMILY

*Oxalidaceae*

This family is chiefly of tropical distribution, with about 15 genera subdivided into some 300 species. Only a few of its members have defied the frost line and invaded the lands where winter comes. They are characterized by the sourness of their watery juices, due to the oxalic acid compounded in their internal economy. In most species of the genus *Oxalis* the plants "sleep" at night and in cloudy weather, the leaflets assuming a resting position at such times. Some authorities do not recognize a woodsorrel family, but place the plants included therein in the geranium family.

### YELLOW WOODSORREL

*Xanthoxalis cymosa* Small

(See Page 230)

The yellow woodsorrel flourishes in fields, thickets, and woods from Ontario and Michigan to Florida and Texas and is a native American plant. Its flowering season ranges from May to October.

Growing from six inches to four feet high, and frequently reclining on its surrounding vegetation, the clover-like leaves, like those of the other woodsorrels, "sleep" at night or in cloudy weather and the seeds are projected considerable distances when the capsular fruit bursts open.

### WATERPLANTAIN FAMILY

*Alismaceae*

This family is made up of a group of aquatic or marsh herbs, living in streams and fresh-water swamps. It consists of about 13 genera and 65 species and includes the waterplantains, the bur-heads, the lophotocarpuses, the arrowheads, and the sagittarias.

### COMMON ARROWHEAD

*Sagittaria latifolia* Willd.

(See Page 231)

Loving shallow water and muddy soils, the common arrowhead is equally at home on the banks of the Rio Grande and on the shores of Hudson Bay. Its flowering season is from July to September.

With no hand to help them, the weeds and wild flowers fight their battle for the survival of the fittest with their own generalship and their own forces. How strikingly is this illustrated by the arrowhead! It must be in a position to maintain itself when the freshet of June comes and submerges it, and again when the drought of August steals the last vestige of water from its pool, so it is able to breathe under water like a fish and out of the water like a dry-land creature. When it is submerged, there are narrow, ribbon-like leaves which give a maximum of surface exposure to the water, and yet a minimum of resistance; but when it grows on dry ground, the ribbon-like leaves fall off, and the big, broad arrowhead leaves assimilate the carbonic acid gas, give off oxygen, and ward off an oversupply of sunshine.

### WILLOW FAMILY

*Salicaceae*

The willow family is made up of a group of trees and shrubs with light wood, bitter bark, and brittle twigs; the several species bear both male and female flowers. It consists of only 2 genera subdivided into about 200 species, mostly native of the North Temperate and Frigid Zones. The poplars belong to the genus *Populus* and the willows, to the genus *Salix*. Included in the former are the poplars, the aspens, the balm-of-Gilead, and the cottonwoods; in the latter, the willows. The members of the genus *Salix* transpire enormous quantities of water and therefore seek damp, moist earth. On this account they are of considerable economic value for drying out damp ground, and for the prevention of the washing away of stream banks through their fine systems of interlacing roots. The purple goat willow, white willow, and purple osier willow are the species most used in basketry and wickerwork. Charcoal made from willow wood is highly valued in the manufacture of gunpowder and crayons.

### PUSSY WILLOW

*Salix discolor* Muhl.

(See Page 232)

Few American shrubs play a more charming part in our folklore than the dainty pussy willow. Inhabiting the damp borders of thickets or creeping down close to the water's edge along small streams, it awakens early to the call of spring, whether in Nova Scotia or Saskatchewan, Delaware or Missouri. Sometimes attaining a height of 12 feet, the pussy willow has a light, greenish brown bark, usual-



Photograph by William H. Zerbe

## IN THE GOOD OLD SUMMER TIME

Some plants seek dry places; others are waders that will not thrive if their feet are not in the water. With their likes and dislikes, they neglect neither the blistering desert, the snow-capped mountains, nor the boggy swamp, softening every landscape and cheering every prospect.





Photographed by Loyd Cooper

#### DESERT FLORA IN CALIFORNIA

Nowhere do plants more clearly illustrate their adaptation to environment than in the desert. With their fight for existence so bitter, they must go the limit in protecting themselves against animals. Distasteful secretions are unusually abundant in desert plants and spines and prickles, the rule. Some, like the living-rock cactus, even employ the art of camouflage to protect them from the animal allies of drought.

ly tinged with red; but the smaller branches are of a deep reddish hue. The winter buds are purple. The catkins are usually well out before the leaves begin to appear. The shoots of the shrub develop roots in the water.

The willows are believed to be descended from some of the oldest flowering plants, in which the sexes were on different trees and the pollen was carried from the one to the other by the wind. To-day they are entomophilous plants, relying on the insects to be their messengers, and ready to pay them well for their services. Color and odor form the printer's ink with which the messengers are attracted by the male catkins, and pollen and nectar, the coin of the messenger realm.

The bees are the busiest pollen purveyors for this plant. The little Andrenid bees, a family whose members are only about half the size of hive bees, are its special visitors. They are well-bearded, each hair being fitted with a row of barbs that cause pollen grains to adhere and be carried to the next flower.

The pussy willow has to serve another insect in a different fashion. A gallfly lays its eggs in its twigs and leaves, and in some way so stimulates the growing tissue that it develops a large series of overlapping scales, which are modified leaves. These, diverted from their normal purpose, are compelled to serve as a cradle for an enemy's offspring. They form cone-like buds an inch or so long, and more than three-fourths of an inch in diameter. Cut one of these galls open at the proper season and you will find ensconced therein, "as snug as a bug in a rug," the sleeping larvae of the gallfly.

### WITCH-HAZEL FAMILY

#### *Hamamelidaceae*

The 40 species of the 13 genera of the witch-hazel family are natives of North America, Asia, and South Africa. Some species are merely shrubs while others are well-developed trees. The fothergilla of the Middle Atlantic States, and the common witch-hazel are the only two representatives of the family in this country.

### COMMON WITCH-HAZEL

#### *Hamamelis virginiana* L.

(See Page 232)

With its home in thickets and low-lying woodlands, and its range reaching from Nova Scotia to the North of Mexico, the witch-hazel is the rear guard of the flower army that marches in panoplied splendor through the spring and summer and fall. Where the trailing-arbutus, the jonquil, the crocus, and the buttercup lead the invading

hosts of beauty, the witch-hazel is so far behind the procession that one might almost wonder whether it be rear guard or straggler.

It follows the fringed gentian, whose beauties have been acclaimed by many poets, and it seldom lends its blossom to the scene before September is well on toward the equinox. From that time until Christmas, even, it gladdens the wood. Surely one may feel when beholding it that time has indeed "grown sleepy at his post and let the exile summer back," or else that it is "her regretful ghost" that stalks abroad. It is about the last feast that Nature prepares for the insect world. Even its leaves have gone, and it has joined the ranks of the "brown and sere" before its flowers come.

As soon as the insect hosts have rendered their toll of pollen-carrying in exchange for the nectar of the flower, it begins to fade and fall. Then comes the seed pod, which hangs on to the tree all the year following, and does not turn loose its seeds until the witch-hazel flowers come again. Then the large, hard, black seeds are discharged through the rupture of the capsule, whose walls pinch them out. They are discharged with enough force to sting the face sharply if they hit an observer. Thoreau once wrote that he heard in the night a strange, snapping sound and the fall of some small body on the floor from time to time. Getting up to investigate, he found it was produced by the witch-hazel nuts on his desk springing open and casting their seeds across his chamber.

We owe our knowledge of the value of witch-hazel bark, for medicinal purposes, to the Indians and it is now used in the making of many kinds of extracts.

For generations the branches have been used as divining rods for the location of waters and precious ores.

A good story is told on Linnaeus in relation to the divining rod made of the branches of the European cousin of the American witch-hazel. On one of his trips through the country, his secretary highly extolled the powers of a witch-hazel divining rod. Linnaeus was sure that it had no virtue, and to prove it concealed a purse containing one hundred ducats under a flower which grew by itself in a meadow. The divining rod could not locate it, and the assembled company, watching the experiment, trampled down the plant under which it was hidden. When Linnaeus went to take it from its hiding place, he could not locate it. His secretary again brought his divining rod into play and told him that it lay somewhere in the opposite direction. Going in the direction the divining rod pointed, Linnaeus finally found his gold, and declared that another such experiment would be sufficient to make a proselyte of him.





ORANGE BLOSSOM  
*Citrus sinensis* Osbeck  
 RUE FAMILY  
 Florida State Flower  
 (See Page 206)



PURPLE AVENS  
*Geum rivale* L.  
 ROSE FAMILY  
 (See Page 203)

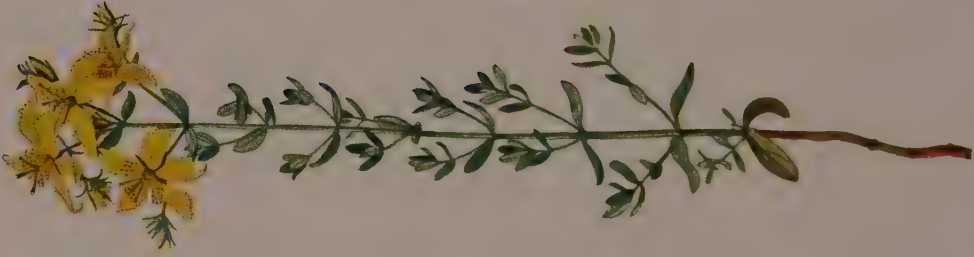
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COMMON WOODRUSH  
*Juncoides campestris* (L.) Ktze.  
RUSH FAMILY  
(See Page 206)



COMMON ST. JOHNSWORT  
*Hypericum perforatum* L.  
St. JOHNSWORT FAMILY  
(See Page 206)



GOLDEN ST. JOHNSWORT  
*Hypericum aureum* Barr.  
St. JOHNSWORT FAMILY  
(See Page 207)





FRASER SEDGE  
*Carex fraseri* Andr.  
SEDGE FAMILY  
(See Page 207)



CORALBELLS  
*Heuchera sanguinea* Engelm.  
SAXIFRAGE FAMILY  
(See Page 207)

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PARTRIDGE PEA  
*Chamaecrista fasciculata* (Michx.) Greene  
 SENNA FAMILY  
 (See Page 207)



CARRIONFLOWER  
*Smilax herbacea* L.  
 SMILAX FAMILY  
 (See Page 209)





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**BLUELEAF GREENBRIER (Upper)**

*Smilax glauca* Walt.

SMILAX FAMILY

(See Page 209)

**ROUNDLEAF GREENBRIER (Lower)**

*Smilax rotundifolia* L.

SMILAX FAMILY

(See Page 209)



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COMMON DAYFLOWER  
*Commelina communis* L.  
SPIDERWORT FAMILY  
(See Page 209)



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VIRGINIA SPIDERWORT  
*Tradescantia virginiana* L.  
 SPIDERWORT FAMILY  
 (See Page 209)



SNOW-ON-THE-MOUNTAIN  
*Euphorbia marginata* Pursh  
 SPURGE FAMILY  
 (See Page 210)





VENUS FLYTRAP  
*Dionaea muscipula Ellis*  
SUNDEW FAMILY  
(See Page 210)



AMERICAN BITTERSWEET  
*Celastrus scandens L.*  
STAFFTREE FAMILY  
(See Page 210)

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PALE SNAPWEED  
*Impatiens pallida* Nutt.  
TOUCH-ME-NOT FAMILY  
(See Page 211)



COMMON VALERIAN  
*Valeriana officinalis* L.  
 VALERIAN FAMILY  
 (See Page 211)



TEASEL  
*Dipsacus sylvestris* Huds.  
 TEASEL FAMILY  
 (See Page 211)





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**BLUE VERVAIN**  
*Verbena hastata* L.  
 Vervain Family  
 (See Page 212)



**VIOLET**  
*Genus Viola*  
 VIOLET FAMILY  
 Illinois, Rhode Island, Wisconsin, and New Jersey  
 State Flower  
 (See Page 212)



VIRGINIA WATERLEAF  
*Hydrophyllum virginianum* L.  
 WATERLEAF FAMILY  
 (See Page 212)



SMALL SPATTERDOCK  
*Nymphaea microphylla* Pers.  
 WATERLILY FAMILY  
 (See Page 212)



AMERICAN WATERLILY  
*Castalia odorata* (Dryand.) Woodb. & Wood  
WATERLILY FAMILY  
(See Page 212)

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AMERICAN LOTUS  
*Nelumbo lutea* (Willd.) Pers.  
WATERLILY FAMILY  
(See Page 213)

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YELLOW WOODSORREL  
*Xanthoxalis cymosa* Small  
WOODSORREL FAMILY  
(See Page 213)



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COMMON ARROWHEAD  
*Sagittaria latifolia* Willd.  
WATERPLANTAIN FAMILY  
(See Page 213)



PUSSY WILLOW  
*Salix discolor* Muhl.  
 WILLOW FAMILY  
 (See Page 213)

COMMON WITCH-HAZEL  
*Hamamelis virginiana* L.  
 WITCH-HAZEL FAMILY  
 (See Page 214)



TABLE I—THE STATE FLOWERS AND HOW THEY HAVE BEEN CHOSEN

NAME OF STATE	NAME OF FLOWER	How CHOSEN	Text Page	Illustration Page
Alabama.....	Goldenrod.....	School Children...	48	67
Arizona.....	Giant Cactus or Sahuaro.....	Legislature.....	84	78
Arkansas.....	Apple Blossom.....	Legislature.....	40	42
California.....	Common California-poppy or Golden Poppy	Legislature.....	198	197
Colorado.....	*Colorado Columbine or Blue Columbine.....	School Children...	89	95
Connecticut.....	Mountain-laurel.....	Legislature.....	112	140
Delaware.....	Peach Blossom.....	Legislature.....	36	38
District of Columbia...	No Choice			
Florida.....	Orange Blossom.....	Legislature.....	206	217
Georgia.....	Cherokee Rose.....	Legislature.....	202	205
Idaho.....	Lewis Mockorange or Syringa.....	Common Consent.	120	144
Illinois.....	Violet.....	Legislature.....	212	227
Indiana.....	†Tuliptree.....	Legislature.....	149	163
Iowa.....	Wild Rose.....	Common Consent.	202	205
Kansas.....	Common Sunflower.....	Legislature.....	49	66
Kentucky.....	Trumpet creeper or Trumpet Vine.....	Common Consent.	56	72
Louisiana.....	Southern Magnolia.....	Legislature.....	149	163
Maine.....	White Pine.....	School Children...	173	190
Maryland.....	Black-eyed-susan.....	Legislature.....	48	65
Massachusetts.....	Trailing-arbutus or Mayflower.....	Legislature.....	113	139
Michigan.....	Apple Blossom.....	Legislature.....	40	42
Minnesota.....	Showy Ladyslipper or Moccasin Flower.....	Legislature.....	164	183
Mississippi.....	Southern Magnolia.....	School Children...	149	163
Missouri.....	Hawthorn.....	Legislature.....	41	47
Montana.....	Bitterroot.....	Legislature.....	199	201
Nebraska.....	Goldenrod.....	Legislature.....	48	67
Nevada.....	Sagebrush.....	Common Consent..	49	55
New Hampshire.....	Common Lilac.....	Legislature.....	164	182
New Jersey.....	Violet.....	Legislature.....	212	227
New Mexico.....	Cactus.....	School Children...	84	78
New York.....	†Rose.....	School Children...	202	205
North Carolina.....	Oxeye Daisy.....	Common Consent.	48	55
North Dakota.....	Wild Prairie Rose.....	Legislature.....	202	205
Ohio.....	§Scarlet Carnation.....	Legislature.....	176	190
Oklahoma.....	American Mistletoe.....	Legislature.....	157	178
Oregon.....	Oregon Hollygrape.....	Legislature.....	60	69
Pennsylvania.....	No Choice			
Rhode Island.....	Violet.....	School Children...	212	227
South Carolina.....	Carolina-jessamine.....	Legislature.....	145	155
South Dakota.....	American Pasqueflower.....	Legislature.....	92	95
Tennessee.....	Maypop or Passionflower.....	State Horticultural Society.....	169	186
Texas.....	Bluebonnet.....	Legislature.....	169	187
Utah.....	Sego-lily.....	Legislature.....	125	154
Vermont.....	Red Clover.....	Legislature.....	169	188
Virginia.....	Flowering Dogwood.....	Legislature.....	93	102
Washington.....	Coast Rhododendron.....	Common Consent.	112	138
West Virginia.....	Rosebay Rhododendron.....	Legislature.....	112	138
Wisconsin.....	Violet.....	Legislature.....	212	227
Wyoming.....	Narrowleaf Painted-cup or Indian Paint-brush.....	Legislature.....	97	115

\* School children voted for the blue columbine.

† Indiana's legislature first chose the carnation, but recently substituted the tuliptree.

‡ The vote did not specify the rose selected.

§ The scarlet carnation of Ohio's choice is of brighter color than the illustration.

## TABLE II—THE FLOWER CALENDAR

THE GROUPING of flowers according to season is a somewhat confusing task. The date of their appearance depends not only on latitude, but also, to a considerable extent on the state of the weather in a given locality. But believing the lay reader will find such a grouping helpful in the identification of flowers as they are met in the fields and woods, this table has been prepared. In it the spring flowers include those blooming usually before May 1st. Early summer flowers are those whose heyday occurs in May and June. The late summer flowers embrace those which bloom after July 1st. These dates probably mark as accurately as any other dates could the march of the several flower armies from the end of one winter to the beginning of the next.

## Spring

Trailing Arbutus, Northern Bay-berry, Bitterroot, American Bladdernut, Virginia Bluebell, Early Highbush Blueberry, Highbush Blueberry, Bluebonnet, Carrionflower, Blue Cohosh, American Columbine, Colorado Columbine, Pink Corydalis, Dandelion, Flowering Dogwood, Dutchmans-breeches, Venus Flytrap, Wild Geranium, Dwarf Ginseng, Goldenclub, Downy Hawthorn, Trumpet Honeysuckle, Ground-ivy, Carolina-jessamine, Southern Magnolia, Low Poppy-mallow, Mazzard, Golden Meadow-parsnip, Orange Blossom, Partridgeberry, American Pasqueflower, Peatpink, American Plum, Cobaea Pentstemon, Creeping Polemonium, Common California-poppy, Pyxie, Coast Rhododendron, Downy Shadblow, Common Shootingstar, Skunkcabbage, Spicebush, Virginia Springbeauty, Virginia Strawberry, Sweetgale, Purple Trillium, Tupelo, Violet, Canada Wildginger, Pussy Willow, Wintergreen, Early Woodbetony, Common Woodrush.

## Early Summer

Willow Amsonia, Apple Blossom, Arethusa, Purple Avens, Flame Azalea, European Barberry, Field Bindweed, American Bittersweet, Black-eyed-susan, Blackhaw, Zigzag Bladderwort, Eastern Blue-eyed-grass, Kentucky Bluegrass, Bluets, Glossy Buckthorn, Vipers-bugloss, Bunchberry, Swamp Buttercup, Common Buttonbush, Cactus, Giant Cactus, Common Cattail, Checkerbloom, Black Cherry, Chokeberries, Red Clover, Corallbells, Corncockle, Cranberry, American Cranberrybush, Wax Currant, Devilsbit, Curly Dock, Silky Dogwood, True Forget-me-not, Field Garlic, Gold-eyegrass, Orchard Grass, Blueleaf Greenbrier, Roundleaf Greenbrier, Orange Hawkweed, Fleshy Hawthorn, American Holly, Oregon Hollygrape, Horsetail, Blueflag Iris, Poison-ivy, Jack-in-the-pulpit, Pink Ladyslipper, Showy Ladyslipper, Small Yellow Ladyslipper, Lambkill, Mountain-laurel, Common Lilac, Blackberry-lily, Canada Lily, Segolily, Maypop, Fourleaf Milkweed, American Mistletoe, Lewis Mockorange, Common Moonseed, American Mountain-ash, Bitter Nightshade, Indian Paintbrush, Beach Pea, Peach Blossom, Pickerelweed, White Pine, Common Pitcherplant, Narrow-

leaf Plantain, Rose Pogonia, Fringed Polygala, Rosebay Rhododendron, Pasture Rose, Perennial Ryegrass, Golden St. Johnswort, Fraser Sedge, Sensitive-plant, Hyssop Skullcap, Snowberry, Snow-on-the-mountain, Sheep Sorrel, Virginia Spiderwort, Poison Sumac, Smooth Sumac, Common Sundrop, Sweetflag, Common Sweetshrub, Common Toadflax, Tuliptree, Heartleaf Umbrella-wort, Common Valerian, Venus Lookingglass, Mapleleaf Viburnum, Virginia Creeper, Virginia Waterleaf, American Waterlily, Withe-rod, Yellow Woodsorrel.

## Late Summer

Alfalfa, Common Amaranth, Common Arrowhead, Eastern Silvery Aster, New England Aster, New York Aster, Beechdrops, Beggar-ticks, Hedge Bindweed, Blooming Sally, American Burnet, Branching Bur-reed, Butterflyweed, Cardinal-flower, Common Carrot, Charlock, Chicory, Purple Coneflower, Coralberry, Oxeye Daisy, Common Dayflower, Tawny Daylily, Common Dodder, American Elder, Common Evening-pimrose, Stiff Yellow Flax, Fernleaf False-foxglove, Yellow Foxtail, Gayfeather, Closed Gentian, Fringed Gentian, Holms Gerardia, Oldfield Goldenrod, Goldmoss, Barnyard Grass, Clammy Groundcherry, Hardhack, Harebell, Common Hop, Rough Joe-pye-weed, Lambsquarters, American Turkscap Lily, Grays Lily, Common Lizardtail, Purple Loosestrife, American Lotus, Common Meadowbeauty, Common Milkweed, Mistflower, Mock-cucumber, Common Mullein, Moth Mullein, Yellow Fringe-orchid, Narrowleaf Painted-cup, Partridge Pea, Pearl Everlasting, Eastern Pentstemon, Sweet-william Phlox, Red Pinesap, Rugels Plantain, Pokeberry, Orange Polygala, Nuttalls Pondweed, Mexican Pricklepoppy, Purpletop, Great Ragweed, Flowering Raspberry, Rattlesnake-root, Redtop, Rosegentian, Common Rosemallow, Crimoneye Rosemallow, Hairy Ruelia, Sagebrush, Common St. Johnswort, Pale Snapweed, Small Spatterdock, Spiderflower, Western Spiderlily, Common Sunflower, Black Swallowwort, Swampcandle, Common Tansy, Arrowleaf Tearthumb, Teasel, Hoary Tickclover, Timothy, Trumpet-creeper, Pink Turtlehead, Blue Vervain, Hairy Wildbergamot, Purple Wildbergamot, Common Winterberry, Common Witch-hazel, Common Yarrow.

## TABLE III—KEY TO FLOWER COLORS

IN ANY arrangement of flowers according to color, it is difficult to assign those which occupy the twilight zones between two colors. For instance, where pink ends and red begins is largely a matter of individual opinion. In this classification the aim has been to assign each flower to the color that seems to predominate.

### Blue to Purple

Alfalfa, Willow Amsonia, Eastern Silvery Aster, New England Aster, New York Aster, Purple Avena, Virginia Bluebells, Bluebonnet, Eastern Blue-eyed-grass, Bluets, Vipers-bugloss, Chicory, Colorado Columbine, Purple Coneflower, Common Dayflower, True Forget-me-not, Field Garlic, Closed Gentian, Fringed Gentian, Harebell, Blueflag Iris, Ground-ivy, Common Lilac, Purple Loosestrife, Maypop, Mistflower, Bitter Nightshade, American Pasqueflower, Beach Pea, Cobaea Pentstemon, Eastern Pentstemon, Pickerelweed, Creeping Polomonium, Rattlesnake-root, Hairy Ruellia, Hyssop Skullcap, Virginia Spiderwort, Teasel, Common Valerian, Venus Lookingglass, Blue Vervain, Violet, Purple Wildbergamot.

### Magenta to Pink

Apple Blossom, Trailing-arbutus, Arethusa, Field Bindweed, Hedge Bindweed, Bitterroot, Blooming Sally, Checkerbloom, Chokeberries, Corncockle, Pink Corydalis, Cranberry, Wax Currant, Gayfeather, Wild Geranium, Holms Gerardia, Hardhack, Rough Joe-pye-weed, Pink Ladyslipper, Showy Ladyslipper, Lambkill, Mountain-laurel, Common Milkweed, Fourleaf Milkweed, Peach Blossom, Peatpink, Sweet-william Phlox, White Pine, Rose Pogonia, Fringed Polygala, Flowering Raspberry, Coast Rhododendron, Rosebay Rhododendron, Pasture Rose, Rosegentian, Common Rosemallow, Sensitiveplant, Common Shootingstar, Snowberry, Spiderflower, Virginia Springbeauty, Arrowleaf Tear-thumb, Hoary Tickclover, Pink Turtlehead, Hairy Wildbergamot.

### Red to Brown

Flame Azalea, Beechdrops, Butterflyweed, Cactus, Cardinalflower, Common Cattail, Red Clover, American Columbine, Coralbells, Trumpet Honeysuckle, Horsetail, Blackberry-lily, Low Poppy-mallow, Common Meadowbeauty, Indian Paintbrush, Narrowleaf Painted-cup, Red Pinesap, Common Pitcherplant, Sagebrush, Skunkcabbage, Sheep Sorrel, Black Swallow-wort, Sweetgale, Common Sweetshrub, Purple Trillium, Trumpet creeper, Heartleaf Umbrella-wort, Canada Wildginger, Early Woodbetony, Common Woodrush.

### Orange to Yellow

European Barberry, Beggar-ticks, Black-eyed-susan, Zigzag Bladderwort, Swamp Buttercup, Carrionflower, Charlock, Blue Cohosh, Dandelion,

Tawny Daylily, Common Evening-primrose, Stiff Yellow Flax, Fernleaf False-foxglove, Goldenclub, Oldfield Goldenrod, Goldmoss, Goldeye-grass, Blueleaf Greenbrier, Roundleaf Greenbrier, Clammy Groundcherry, Orange Hawkweed, Oregon Holly-grape, Carolina-jessamine, Small Yellow Lady-slipper, American Turkscap Lily, Canada Lily, Grays Lily, American Lotus, Golden Meadow-parsnip, Common Mullein, Yellow Fringe-orchid, Partridge Pea, Narrowleaf Plantain, Orange Polygala, Nuttalls Pondweed, Common California-poppy, Mexican Pricklepoppy, Great Ragweed, Common St. Johnswort, Golden St. Johnswort, Pale Snapweed, Small Spatterdock, Spicebush, Common Sundrop, Common Sunflower, Swampcandle, Common Tansy, Common Toadflax, Tupelo, Pussy Willow, Common Witch-hazel, Yellow Wood-sorrel.

### White to Green

Common Amaranth, Common Arrowhead, Northern Bayberry, American Bittersweet, Blackhaw, American Bladdernut, Early Highbush Blueberry, Highbush Blueberry, Glossy Buckthorn, Bunchberry, American Burnet, Branching Bur-reed, Common Buttonbush, Giant Cactus, Common Carrot, Black Cherry, Coralberry, American Cranberrybush, Oxeye Daisy, Devilsbit, Curly Dock, Common Dodder, Flowering Dogwood, Silky Dogwood, Dutchmans-breeches, American Elder, Venus Flytrap, Dwarf Ginseng, Downy Hawthorn, Fleshy Hawthorn, American Holly, Common Hop, Poison-ivy, Jack-in-the-pulpit, Lambs-quarters, Sego-lily, Common Lizardtail, Southern Magnolia, Mazzard, American Mistletoe, Mock-cucumber, Lewis Mockorange, Common Moonseed, American Mountain-ash, Moth Mullein, Orange Blossom, Partridgeberry, Pearl Everlasting, Rugels Plantain, American Plum, Common Pokeberry, Pyxie, Crimson-eye Rosemallow, Fraser Sedge, Downy Shadblow, Snow-on-the-mountain, Western Spiderlily, Virginia Strawberry, Poison Sumac, Smooth Sumac, Sweetflag, Tuliptree, Mapleleaf Viburnum, Virginia Creeper, Virginia Waterleaf, American Waterlily, Common Winterberry, Wintergreen, Withe-rod, Common Yarrow.

### Miscellaneous

Kentucky Bluegrass, Yellow Foxtail, Barnyard Grass, Orchard Grass, Purpletop, Redtop, Perennial Ryegrass, Timothy.



TABLE IV—LIST OF COLOR PLATES AND FLOWER BIOGRAPHIES

Name of Flower	Text Page	Illus- tration Page	Name of Flower	Text Page	Illus- tration Page
A					
Alfalfa.....	172	187	Coralbells.....	207	219
Amaranth, Common.....	40	38	Coralberry.....	120	142
Amsonia, Willow.....	92	98	Corncockle.....	194	192
Apple and Blossom.....	40	42	Corydalis, Pink.....	104	119
Arbutus, Trailing.....	113	139	Cranberry.....	64	73
Arethusa.....	165	184	Cranberrybush, American.....	117	142
Arrowhead, Common.....	213	231	Currant, Wax.....	108	126
Aster, Eastern Silvery.....	53	59	D		
Aster, New England.....	52	62	Daisy, Oxeye.....	48	55
Aster, New York.....	53	55	Dandelion.....	88	87
Avens, Purple.....	203	217	Dayflower, Common.....	209	222
Azalea, Flame.....	113	140	Daylily, Tawny.....	125	151
B			Devilsbit.....	64	77
Barberry, European.....	60	69	Dock, Curly.....	81	79
Bayberry, Northern.....	57	70	Dodder, Common.....	96	98
Beechdrops.....	81	76	Dogwood, Flowering.....	93	102
Beggar-ticks.....	53	59	Dogwood, Silky.....	93	99
Bindweed, Field.....	160	180	Dutchmans-breeches.....	104	118
Bindweed, Hedge.....	160	179	E		
Bitterroot.....	199	201	Elder, American.....	117	144
Bittersweet, American.....	210	224	Evening-primrose, Common.....	96	106
Black-eyed-susan.....	48	65	F		
Blackhaw.....	120	142	Flax, Stiff Yellow.....	104	118
Bladdernut, American.....	60	73	Flytrap, Venus.....	210	224
Bladderwort, Zigzag.....	64	74	Forget-me-not, True.....	61	75
Blooming Sally.....	96	107	Foxglove, Fernleaf False.....	101	114
Bluebells, Virginia.....	61	75	Foxtail, Yellow.....	109	136
Blueberry, Early Highbush.....	64	74	G		
Blueberry, Highbush.....	64	74	Garlic, Field.....	128	151
Bluebonnet.....	169	187	Gayfeather.....	56	58
Blue-eyed-grass, Eastern.....	124	147	Gentian, Closed.....	105	119
Bluegrass, Kentucky.....	109	132	Gentian, Fringed.....	104	122
Bluets.....	148	162	Gentian: See Rosegentian.		
Buckthorn, Glossy.....	81	77	Geranium, Wild.....	105	123
Bugloss, Vipers.....	64	76	Gerardia, Holms.....	101	103
Bunchberry.....	93	99	Ginseng, Dwarf.....	105	126
Burnet, American.....	203	208	Goldenclub.....	45	54
Bur-reed, Branching.....	57	71	Goldenrod, Oldfield.....	48	67
Buttercup, Swamp.....	89	94	Goldmoss.....	168	185
Butterflyweed.....	152	174	Grass, Barnyard.....	109	130
Buttonbush, Common.....	148	159	Grass: See Bluegrass.		
C			Grass, Goldeye.....	40	39
Cactus.....	84	78	Grass, Orchard.....	112	137
Cactus, Giant.....	84	78	Grass: See Purpletop.		
Cardinalflower.....	128	158	Grass: See Redtop.		
Carnation, Red.....	176	190	Grass: See Ryegrass.		
Carriionflower.....	209	220	Grass: See Timothy.		
Carrot, Common.....	168	186	Grass: See Yellow Foxtail		
Cattail, Common.....	85	86	Greenbrier, Blueleaf.....	209	221
Charlock.....	160	180	Greenbrier, Roundleaf.....	209	221
Checkerbloom.....	152	170	Groundcherry, Clammy.....	161	181
Cherry, Black.....	37	34	H		
Chicory.....	88	90	Hardhack.....	203	205
Chokeberries.....	44	46	Harebell.....	56	71
Clover, Red.....	169	188			
Cohosh, Blue.....	60	70			
Columbine, American.....	89	91			
Columbine, Colorado.....	89	95			
Coneflower, Purple.....	56	58			

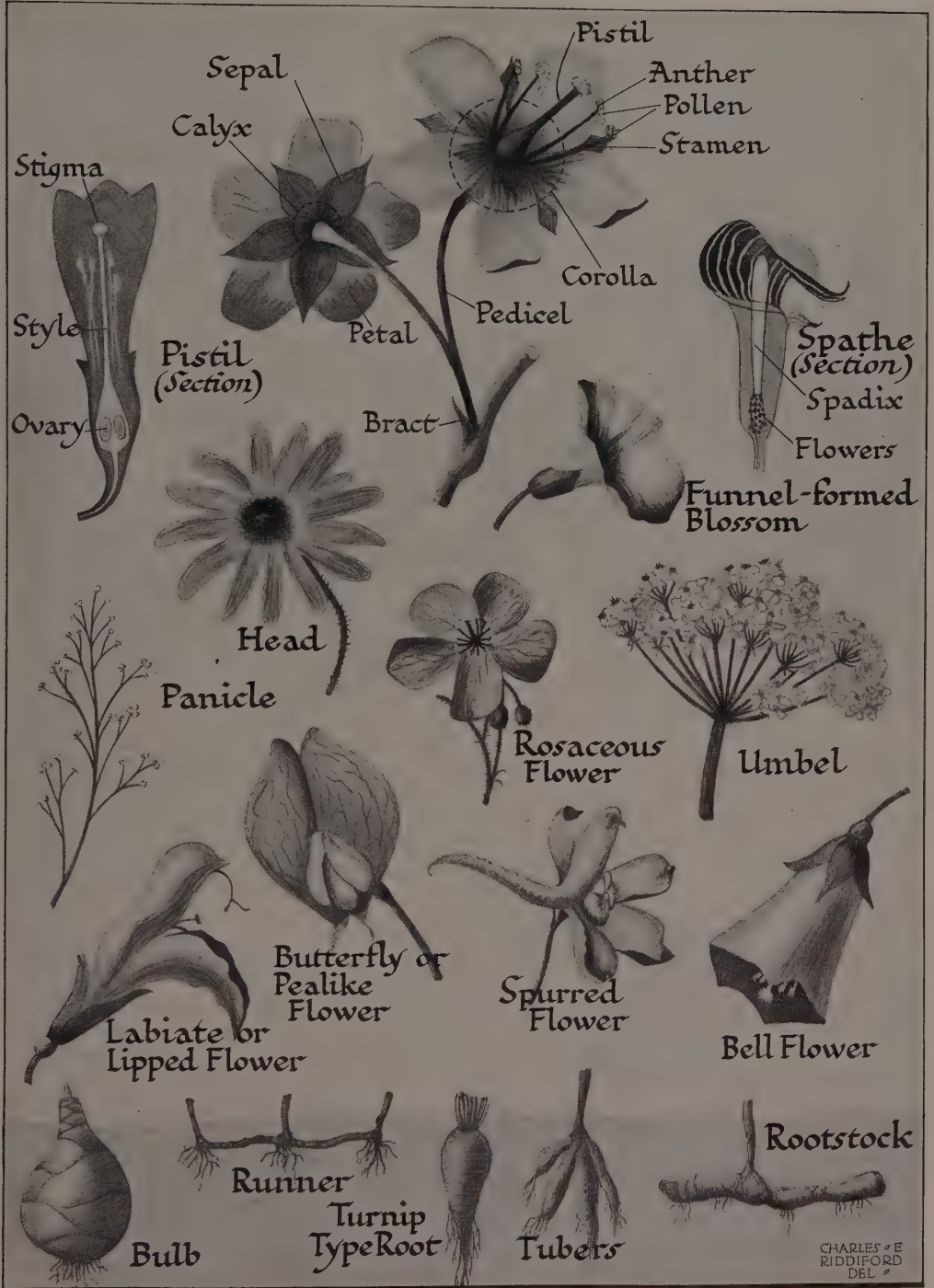
TABLE IV—LIST OF COLOR PLATES AND FLOWER BIOGRAPHIES (Continued)

Name of Flower	Text Page	Illus- tration Page	Name of Flower	Text Page	Illus- tration Page
Hawkweed, Orange.....	89	87	O		
Hawthorn, Downy.....	41	47	Orange Blossom.....	206	217
Hawthorn, Fleshy.....	41	47	Orchid, Yellow Fringe.....	165	183
Holly, American.....	116	141	P		
Hollygrape, Oregon.....	60	69	Paintbrush, Indian.....	97	103
Honeysuckle, Trumpet.....	117	141	Painted-cup, Narrowleaf.....	97	115
Hop, Common.....	161	181	Partridgeberry.....	148	162
Horsetail.....	121	146	Pasqueflower, American.....	92	95
I			Pea, Beach.....	172	188
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